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Original Contributions

The Role of Surgery in the Treatment of Arteriosclerosis of the Major Vessels

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THAT segment of our population represented by the older age group is increasing steadily. As a result, the therapeutic management of arteriosclerotic vascular disease states has assumed greater importance to physicians. So far, most of these effort have been palliative.

Palliative surgical therapy has been of these types: Sympathectomy to lessen the peripheral resistance in an ischemic area by causing a permanent but localized vasodilation; thromboendarterectomy to re-establish arterial continuity by excision of the intraluminal obstruction; bypass shunts around the obstruction; and, lastly, replacement of occluded sites by grafts of homologous arteries, autogenous veins, or plastic prostheses.

Sympathectomy

Lumbar sympathectomy, as described by Royal¹ in 1924, has been of some value in the treatment of peripheral vascular occlusions. We prefer a bilateral resection of the sympathetic ganglia from lumbar 1 to 4 on the more affected side and from lumbar 2 to 4 ganglia on the side of lesser involvement. This avoids sterility in the young male secondary to an inability to ejaculate. Either a lateral or an anterior retroperitoneal approach may be used, depending upon the body build of the patient (Fig. 1). If the abdominal cavity is opened for an attempt at restitution of arterial continuity, a concomitant transabdominal sympathectomy may also be performed, although expos-

ure of the sympathetic trunks from this anterior approach can be more difficult. We generally prefer to add sympathectomy in all attempts at revascularization of the lower extremity. The dilatation of the collateral vessels, thus induced,



Fig. 1. Abdominal incisions for the anterior approach to a bilateral lumbar sympathectomy, with the patient lying supine on the operative table.

add to the protection of the extremity if there is a failure of other techniques to re-establish an adequate arterial flow. Also, after sympathectomy, the rate of the distal arterial flow is probably increased secondary to a decreased peripheral resistance and a secondary thrombosis may be less likely in the area of the arteriotomy.

The initial salutary effect of sympathectomy for the appropriate case has been well document-

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TABLE I. RELATIVE CHANGE IN PERIPHERAL PULSE VOLUME AFTER LUMBAR SYMPATHECTOMY, AT 20° C.

Percentage Increase	31 Studies	Number
Fall		1
0-100		2
100-200		2
200-300		2
300-400		3
400-500		1
500-600		5
600-700		1
700-800		1
800-900		0
900-1000		1
Over 1000		12

ed by the studies of DeBakey,² Collier,³ and others. In thirty-one patients we, too, have attempted to carry out objective long term evaluations of our results after the operation. Electroplethysmographic measurements were made of the digit pulse volume before and after surgery (Table I). The series consists of an unselected six females and twenty-five males who were studied in a constant temperature room according to the method of Windsor.⁴ Initial determinations were made prior to the sympathectomy and again after an interval of one to three years.

There was a seven-fold mean change in peripheral pulse volume following sympathectomy, with a range from minimal effect to a ten-fold increase. In ten per cent of the patients the change was minimal, and this observation was interpreted as signifying a fixation of the distal arterial bed. However, for the remainder of the group the procedure appeared to be beneficial.

In regard to sympathectomy, its greatest value seems to be for patients with arterial occlusions in the thigh and/or popliteal areas. The results in diabetic persons with arteriopathies were disappointing, as this group was largely represented by individuals with terminal arterial disease. For the older patients, the accomplishments were insignificant and, in fact, for 50 per cent of the persons over seventy years of age, the peripheral pulsations after sympathectomy decreased. The amount of relief of claudication by sympathectomy was disappointing in our series unless ancillary procedures were included. Our experience suggests that a real increase in skin temperature on the sympathectomized extremity was associated with an increase in cutaneous blood flow, which partially protected the extremity against early skin breakdown.

Thromboendarterectomy

The introduction of aortography and femoral angiography have given the surgeon a better meth-

od of evaluating the location and extent of arterial occlusions. These techniques have changed the earlier concept that arterial occlusions were usually generalized in distribution, to the idea of segmental arterial disease as a frequent cause of the ischemic extremity. Once this premise was appreciated, a number of methods for the reconstitution of the arterial pathways developed.

The technique of thromboendarterectomy was introduced by Dos Santos⁵ in 1947. In this procedure the occluded arterial segment is incised longitudinally and the localized thrombus as well as the diseased intima are enucleated. The arter-

TABLE II. THROMBOENDARTERECTOMY

Artery	Number	Successful	Failure
Aorta Iliac Stenosis.....	1		1
Aorta Iliac Bilateral.....	3	1	2
Aorta Iliac Unilateral.....	2	2	
Iliac	4	3	1
External Iliac	4	3	1
Ilio Femoral	3	1	2
	17	10	7

Expired: 3 Amputation: 3

ial wall is reconstituted from the remaining media and adventitia. Three important technical factors should be observed. The distal arterial bed should be protected against thrombosis by heparinization during the interval of arteriotomy while the artery is clamped. The distal intima must be firmly attached to the arterial wall to prevent a subsequent subintimal dissecting process causing obstruction and secondary thrombosis. To obviate the second factor we have found it advantageous either to suture the intima to the wall at the distal line of resection, or to transect the artery completely at this point and anastomose these ends. Finally, there must be an ample lumen distal to provide for drainage past the endarterectomy site. In the healing process of this raw area, new intima regenerates by the organization of fibrin deposited upon the arterial wall and from the migration of endothelial cells. The endarterectomy procedure has lent itself well to the management of short arterial occlusions of the terminal aorta, iliac, and femoral arteries.

Since 1953 we have employed this technique in seventeen patients. They have been observed from six months to four years (Table II). We have not attempted this procedure below the femoral area due to the small size of the arteries here and the degree of distal arterial disease commonly encountered in this group. Our experience with aorta-iliac stenosis though limited has revealed a potentially grave complication of endarterectomy

in this area. When the collateral channels are inadequate around this lesion and if it is necessary to occlude the distal blood flow for any length of time during the operative procedure, a

Of the six patients with aorta-iliac disease, three were failures and three patients have had excellent results (Figs. 2 and 3). One failure took place at surgery and most likely represented a

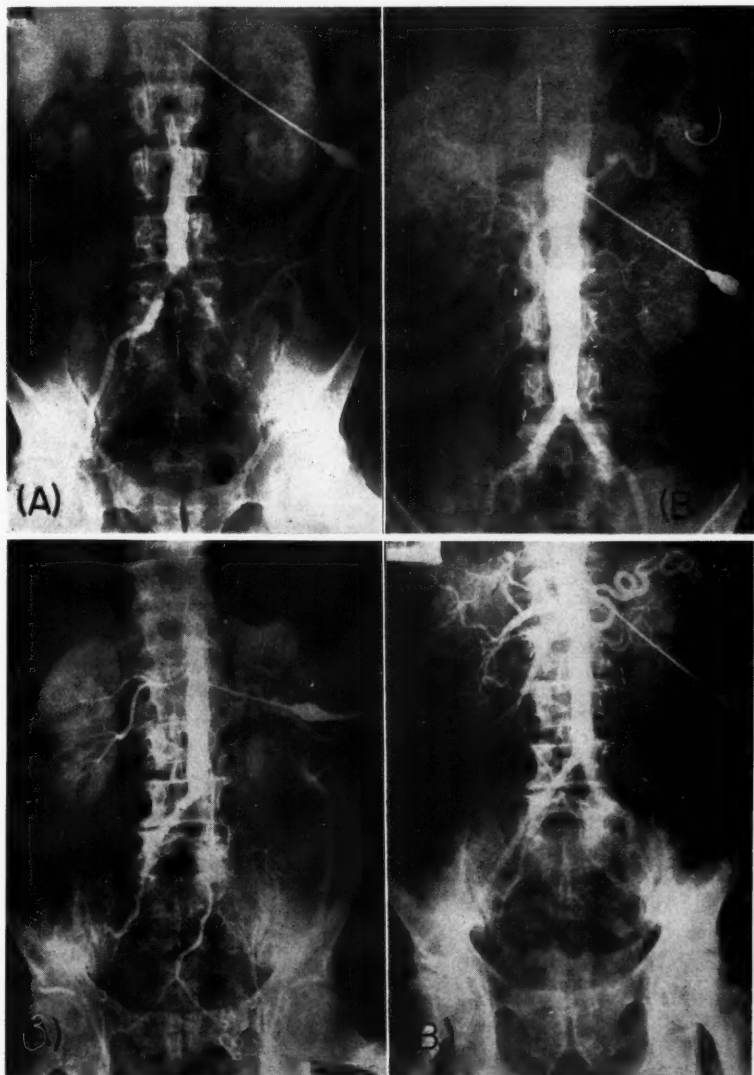


Fig. 2. (Above) (a) Preoperative aortogram showing bilateral aorta-iliac artery stenosis with left hypogastric occlusion. (b) Postoperative aortogram—thromboendarterectomy—showing an excellent distal arterial flow.

Fig. 3. (Below) (a) Preoperative aortogram showing a left iliac and right external iliac occlusion. (b) Postoperative aortogram after thromboendarterectomy showing re-established arterial continuity.

"tourniquet shock syndrome" can be provoked following release of the occluding clamp. Another and more serious complication of endarterectomy should the procedure fail, is loss of the extremity.

lack of distal arterial "run off" because of the advanced state of peripheral disease. There was another unsatisfactory result in a patient who developed thrombosis at the operative site one year after the endarterectomy. One patient expired



Fig. 4. Aortogram of an aorta iliac aneurysm which was replaced with a polyvinyl arterial prosthesis.

from tourniquet shock and myocardial infarction during the immediate postoperative period.

Eight patients had ilio-hypogastric or external iliac occlusions, and in all but two the initially successful result has persisted. One of the latter expired of an acute myocardial infarct on the fifth postoperative day; the other developed a hematoma at the arteriotomy site which required replacement with an arterial homograft.

Three patients with ilio-femoral disease were operated upon. In one the procedure was successful; the remainder were failures. One person expired from an acute myocardial infarction on the tenth postoperative day and the other case developed a re-thrombosis. Summarizing the results in this series of seventeen attempts at arterial reconstitution by thromboendarterectomy, seven failed and ten succeeded. The degree of improvement for the latter has been good. Here the peripheral pulse volumes are often many times the preoperative value. Rest pain and claudication have been relieved in all instances.

TABLE III. THROMBOENDARTERECTOMY
17 Patients

Artery	Result	Comment
Aorta Iliac Stenosis	Expired	Tourniquet shock
Aorta Iliac, Bilateral	Good	One side is open at 2 months
Aorta Iliac, Bilateral	Failure	Thrombosed at 1 year
Aorta Iliac, Bilateral	Failure	Bilateral amputations
Aorta Iliac, Unilateral	Excellent	36 months postoperative
Aorta Iliac Hypogastric	Excellent	24 months postoperative
Iliac	Failure	Hematoma, replaced with a homograft
Iliac	Excellent	4 months postoperative
Iliac and Hypogastric	Excellent	24 months postoperative
Iliac	Excellent	26 months postoperative
External iliac	Excellent	28 months postoperative
External iliac	Expired	1 year postoperative from a C.V.A.
External iliac	Excellent	24 months postoperative
External iliac	Expired	5th postoperative day from acute coronary thrombosis
Ilio-femoral	Expired	10th postoperative day due to coronary thrombosis
Ilio-femoral	Failure	Amputation
Ilio-femoral	Excellent	36 months postoperative

TABLE IV. ARTERIAL HOMOGRAFTS

Artery	Lesion	Number	Successful	Failure
Subclavian	Occlusion	1	1	
Aorta	Aneurysm	7	6	1
Aorta Bifurcation	Aneurysm	7	4	3
Aorta Femoral	Occlusion	2	1	1
Iliac	Occlusion	1	1	
Femoral	Occlusion	1	1	
		19	14	5

The number of postoperative complications in this group is larger than desired, but reflects in a fair measure the general condition of the vascular system for the type of arteriosclerotic patient. The particular lesion undergoing surgical treatment is but one aspect of generalized arterial disease, e.g. three patients expired with acute myocardial infarcts during the postoperative period and another died one year after surgery of a cerebral vascular accident. Too, one developed a middle cerebral artery occlusion on the fifth postoperative day but eventually recovered (Table III).

Arterial Replacement

When the patient has either longer arterial occlusions or aneurysmal formation, the techniques of arterial replacement have proven somewhat more satisfactory (Fig. 4). We have used arterial homografts and plastic prosthesis. We prefer the former. To date, nineteen arterial homografts have been utilized, with five failures (Table IV). Three of the bad results occurred in patients with a ruptured aortic aneurysm. Despite recovery from the immediate operative problem, they eventually succumbed to renal failure. Another replacement of a thoraco-abdominal aneurysm failed due to the development of a generalized bleeding tendency late in the course of the surgery. To



Fig. 5. Arterial replacement of a femoral aneurysm with a "crimped" polyvinyl arterial prosthesis. (a) Common femoral artery (b) Aneurysm prior to removal (c) Ivalon prosthesis (d) Superficial femoral artery.

date, only one arterial homograft has thrombosed. This was an instance of an iliac artery by-pass. This failure may well have been due to a poor status of the arterial vessel distally.

Hufnagel⁶ and Schumacker⁷ and others have presented encouraging data using such arterial prostheses as vinyon-N, nylon and polyethylene, orlon and dacron. Shumway and Lewis⁸ have described experimental studies with the use of a polyvinyl sponge, and we have also used this material as an arterial prosthesis in sixteen patients (Table V). It is easy to fabricate, to suture, and may be "crimped." This tends to minimize internal kinking as the prosthesis is flexed across a movable joint. The wavy external contour reduces the problem of internal clots forming at bend sites (Fig. 5). An aortic bifurcation graft of ivalon thrombosed one month postoperatively and required a re-operation to remove a clot in the iliac limb of this bifurcation graft. The viability of this extremity was preserved, but nine days later the patient succumbed due to hemorrhage from the distal (iliac) anastomotic site on this same side. One femoral plastic graft became infected and, though promptly removed, that patient developed multiple abscesses, a septicemia and expired. Another plastic replacement for a common iliac artery thrombosed during the operative procedure. One patient in whom a ruptured aortic aneurysm was replaced by an ivalon prosthesis expired from a myocardial infarction and renal shutdown on the fifth postoperative day. Four other plastic arterial prostheses thrombosed after functioning for three to twelve weeks. The remaining eight of the sixteen ivalon grafts



Fig. 6. Femoral arteriogram showing occlusion of the superficial femoral artery which was satisfactorily grafted with a "by-pass" technique.

appear to be working all right to date, although the follow-up period is still short. On the basis

TABLE V. COMPRESSED POLYVINYL (IVALON) ARTERIAL PROSTHESES

Artery	Number	Successful	Failure
Aorta	4	3	1
Aortic Bifurcation	2	1	1
Aorta Femoral	1		1
Iliac	3	2	1
Ilio Femoral	4	2	2
Femoral Popliteal	2		2
	16	8	8
Expired: 2 Amputation: 0			

of this experience we believe that homografts are preferable for replacement of arterial segments.

Distal to the common femoral area, segmental arterial occlusions are most common in Hunter's canal (Fig. 6). The small size of the femoral artery here increases the danger from subsequent thrombosis after thromboendarterectomy. Like-

wise, arterial replacement techniques as carried out by Linton⁹ have been disappointing. We have preferred the use of saphenous vein autografts

was there deemed to be an adequate distal run off flow. In this patient also there existed the extenuating fact that a femoral aneurysm com-



Fig. 7. (A) Functioning saphenous vein autograft as an arterial by-pass showing the femoral exposure. A. Saphenous vein graft. B. Common femoral artery. (B) Popliteal exposure. A. Saphenous vein graft. B. Popliteal artery.

TABLE VI. AUTOGENOUS SAPHENOUS VEIN BY-PASS GRAFTS

Artery	Number	Successful	Failure
Aorta Femoral	2	2	
Aorta Iliac	1		1
Ilio Femoral	2	1	1
Femoral Popliteal	13	11	2
Popliteal	2	2	
	20	16	4
Expired: 0 Amputation: 0			

in this area using a "by-pass" technique as described by Kunlin^{10,11}. With this procedure, the collateral blood supply to the extremity is not destroyed by an extensive dissection along the course of the artery. The procedure has proven simple and involved scant operative risk. In addition, the dependence upon material from an arterial homograft bank has been reduced. We have used saphenous vein autografts to by-pass occluded segments of peripheral arteries in eighteen instances (Table VI). Two intra-abdominal grafts of this type were also successful. One of these has remained in place over eighteen months without evidence of aneurysmal dilatation at subsequent angiography. Of two iliofemoral by-passes, one was successful. The most frequent use (thirteen patients) of this graft has been to by-pass superficial femoral arterial occlusions. Eleven persons in this group of cases apparently have patent and well functioning shunts at this time. Two popliteal by-pass grafts were attempted successfully.

As we have indicated earlier for other grafting procedures, the long term results will depend primarily upon the adequacy of the distal vascular bed. In only one of the four cases which failed



Fig. 8. Femoral arteriogram showing popliteal artery occlusion without distal large artery visualization, treated by lumbar sympathectomy.

pressed the soft graft and probably contributed to its ultimate thrombosis.

The presence of gangrene of a distal digit does

not contraindicate this type of surgical procedure. One of our successful superficial femoral by-pass grafts was completed in a patient with gangrene of two toes. After the shunt around the superficial femoral arterial occlusion was working, the gangrenous area failed to progress, and healing occurred at that line of demarcation. The establishment of a successful graft may complicate the problem of post-debridement bleeding because a previously dry wound can bleed once a "high pressure" flow has been re-established (Fig. 7).

To date, below the popliteal artery, the small size of the arterial lumen and technical difficulties related to exposure of the artery for an anastomosis has precluded attempts using the by-pass technique. For occlusive disease of the calf, lumbar sympathectomy is about the only definite surgical therapy of demonstrated value (Fig. 8).

Summary and Conclusions

A review of the surgical techniques used in the treatment of vascular occlusions has been presented and the early results of these procedures are discussed. For short length terminal aortic and ilio-femoral occlusions we prefer a thromboendarterectomy. For longer occlusions and aneurysms, an arterial replacement is deemed best and the arterial homograft seems to be the agent of choice. For some patients, combinations of thromboendarterectomy with an arterial homograft are of value. The use of ivalon fabricated prostheses for replacement of excised arterial segments has given less satisfactory results than preserved arterial homografts. Saphenous vein autografts as a by-pass are satisfactory in segmental femoral and

popliteal occlusions. With the exception of the older age groups (over seventy years of age) and in diabetic terminal arteritis, a lumbar sympathectomy is felt to be of value in increasing arterial blood flow.

It is to be hoped that in the near future, studies in the field of lipid metabolism and transport will enable a more direct attack upon the basic causes of this disease.

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VALUE OF X-RAY IN LOCATING BRAIN TUMORS

The value of radiological examination in detecting brain tumors has been emphasized in a report from a Seattle, Washington, radiologist, Eva L. Gilbertson, who has published the results from a study of more than 660 patients with proven brain tumors. The report appears in the August, 1956, issue of the *American Journal of Roentgenology, Radium Therapy and Nuclear Medicine*, and was prepared in collaboration with Dr. C. Allen Good, radiologist at the Mayo Clinic, Rochester, Minnesota.

"The study was made in order to determine the value of roentgenological examination in the localization of lesions in the brain," Dr. Gilbertson pointed out.

"Some indication of an intracranial lesion was present in approximately two-thirds of the roentgenograms reviewed. Tumors of the pituitary gland produced the highest incidence of localizing signs," she continued.

The Seattle specialist advanced these conclusions in the report: In some patients with a brain lesion, the neurologic signs and symptoms are of such a nature that an x-ray examination is not necessary for localization. In these, radiographs are taken for corroborating evidence.

In another group of patients, the radiographs provide leads as to the anatomic site and extent of the tumor, and they may help to determine the method of surgical approach.

Leiomyosarcoma of the Small Bowel

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WE have chosen to collect from the literature available to us those cases of leiomyosarcoma of the jejunum and ileum reported since 1930. The reports appearing prior to 1930 have been thoroughly detailed by Anderson and Doob.¹ Our aim is to review those case reports published since 1930 and to outline the history, findings and subsequent course in two personal cases. The accuracy of any statistical statements made on the basis of such a group of collected cases is not too great, since they are incomplete numerically, being small groups of cases, each reported by different observers employing differing clinical, surgical and pathologic approaches. In many reports, the data given are vague and incomplete. These tumors when seen in the duodenum present quite different clinical and therapeutic problems.^{1,17,25,52} The only article concerning leiomyosarcomas of the entire gastrointestinal tract in one exhaustive presentation is that of Golden and Stout.²²

The total number of cases of this type of tumor is undoubtedly much larger than the number of cases collected from the available literature would indicate. For example, an article describing malignant tumors of the small intestine treated surgically at the Mayo Clinic from 1907 to 1939 reported eight cases of leiomyosarcoma.³³ This and other similar series⁴⁹ have not been the subject of detailed case reports and are therefore not available for analysis. Thus, it is not possible to be dogmatic on the basis of such an incomplete series of cases.

Even in the best of hands, there may justifiably be room for doubt as to the pathologic diagnosis, as pointed out by Frank, Miller and Bell,¹⁸ who discussed at some length the difficulties in differentiating among fibrosarcoma, leiomyosarcoma and neurofibrosarcoma. More recently, Golden and Stout²² have clarified this matter, showing that these tumors are of smooth-muscle origin. MacFarland³² found in a collection of re-

ports of almost 60,000 cases of uterine myomas that pathologic criteria for malignancy in this type of growth were inconsistent. The percentage of malignant change reported by various observers varied from zero to 10 per cent.

Statistics concerning the occurrence of this lesion in the small intestine vary widely. It is certain, however, that leiomyosarcoma of this portion of the gastrointestinal tract is an extremely rare condition. Raiford,³⁸ in 1932, in a most exhaustive article, reported a total of 986 tumors of the gastrointestinal tract, benign and malignant, seen at the Johns Hopkins Hospital. Included in this total were fifty benign and thirty-eight malignant tumors of the small intestine. Of the malignant tumors, none was a leiomyosarcoma. Of 813 tumors of the entire gastrointestinal tract seen at the Army Institute of Pathology in patients between the ages of eighteen and thirty-eight during 1941 to 1945, only three were leiomyosarcomas and none was in the small intestine.¹⁴ Jones and Brubaker²⁸ reported twenty-two patients having surgically explored tumors of the small intestine at the Cleveland Clinic up to 1942. Only one instance of leiomyosarcoma was encountered. Surgically treated malignant lesions of the small intestine in the afore-mentioned series at the Mayo Clinic numbered 108; these represented 1.5 per cent of the surgical malignant lesions of the large intestine observed in the same period. Of these 108 tumors, eight were leiomyosarcomas of the jejunum and ileum.

Cameron,⁶ in reporting four personal cases and 196 recorded cases of malignant lesions of the small bowel, found nine leiomyosarcomas. In 1945, Shallow, Eger and Carty⁴² reported a primary adenocarcinoma of the midjejunum and reviewed thirty-eight consecutive histologically proved primary malignant tumors of the small bowel. They made a detailed study of malignant lesions of the intestine among the records of 137,174 general autopsies collected from the literature from 1858 to 1938 and tabulated 5,034 such lesions in the large intestine and 134 in the small

Presented before the Minneapolis Surgical Society, October 6, 1955.

intestine. This is an incidence of malignant tumor of the small intestine of 0.1 per cent, about 36 times less frequent than large-intestinal neoplasms. They found that 3 per cent of intestinal carcinomas and 60 per cent of intestinal sarcomas occur in the small intestine. In surveying the incidence and distribution of carcinomas and sarcomas among primary small-intestinal malignant lesions, they tabulated 269 cases, including their own 38. They found 73 carcinomas and 12 sarcomas in the duodenum, 75 carcinomas and 21 sarcomas in the jejunum, and 38 carcinomas and 50 sarcomas in the ileum. They concluded that carcinoma is twice as common as sarcoma in the small intestine and that malignant tumors in general occur with equal frequency in all three divisions of the small intestine, the ileum ranking the lowest for carcinoma but highest for sarcoma.

Detailed discussion of the pathologic features of these tumors is extensively presented elsewhere.^{22,24,29,49} They are thought to represent malignant change in a pre-existing leiomyoma. It is stated that 15 to 20 per cent of these myomas become malignant.³

Summary of Forty-five Reported Cases*

Age.—The youngest patient was four days old; the oldest seventy-six years. There was one patient in the age group from infancy to ten years, one in group eleven to twenty; one in group twenty-one to thirty; seven in group thirty-one to forty; fifteen in group forty-one to fifty; twelve in group fifty-one to sixty; six in group sixty-one to seventy; two in group seventy-one to eighty.

Sex.—Distribution as to sex was about equal, there being twenty-five male and twenty female patients.

Race.—Two negroes were reported. The remainder were white.

Symptoms and Signs.—The duration of preoperative symptoms varied a great deal. Two patients had had no symptoms whatsoever. One had had symptoms presumably due to the lesion for seventeen years; this man had recurring episodes of severe melena from an ulcerating, bleeding lesion of the jejunum. Abdominal pain of one type or another was noted in thirty-one of

the forty-five cases. In eight cases, signs and symptoms of an acute perforating lesion were present; in two more the picture of a slow or chronic perforation was seen, with walling off and localization. Obstruction was an occasional clinical feature. In eight cases, it was of an emergent, acute nature, and in eight the obstruction was chronic and intermittent. A palpable mass was present in seventeen cases. This was usually abdominal, but in two cases it was found on rectal examination and in another on vaginal examination. Gross hemorrhage was a frequent feature, with twenty patients having had intermittent melena varying from massive bright-red bleeding to tarry stools. Anemia was present in nineteen cases and absent in twelve; no mention was made of hematologic data in 14 reports. With the exception of x-ray studies, other laboratory findings were not helpful. Small-bowel x-ray examinations were made in fifteen cases; results in nine were reported as negative. In three cases, a small-bowel tumor was diagnosed. In the three remaining cases, the roentgenologic diagnosis was Meckel's diverticulum. In these cases, the tumors were found at operation to be arising in Meckel's diverticulum. A barium enema disclosed an intussusception in the terminal ileum in one case. This was found at operation to be due to a pedunculated intraluminal tumor as the intussusciptions.

Diagnosis.—The difficulty in the preoperative diagnosis of these lesions is amply testified to by a mere listing of the preoperative diagnoses given in the case reports. These included acute appendicitis twice, pelvic inflammatory disease and peritonitis, chronic tuberculous peritonitis, intestinal obstruction five times, uterine tumor in three cases, perforated peptic ulcer or perforated viscus in three, bleeding duodenal ulcer in two, Meckel's diverticulum three times, extrarectal mass, ruptured ectopic pregnancy, and peritonitis from a strangulated inguinal hernia. In three of the forty-five cases, a diagnosis of tumor of the small bowel was made, based in each instance on the x-ray findings. In seventeen cases, the preoperative diagnosis was not stated in the report. At first glance, these seem to represent a rather wide variety of diagnoses, but it should not be felt that this represents any lamentable lack of diagnostic acumen. In almost every case, there were perfectly sound and acceptable reasons for the diagnosis

*See References 2, 4, 5, 7, 8, 9, 10, 11, 12, 13, 16, 22, 23, 24, 26, 27, 28, 29, 30, 31, 35, 37, 39, 40, 41, 44, 45, 46, 47, 48, 49, 50, 51, 53.

that was made. The lesions were quite evenly spread through the small intestine; twenty-one were in the jejunum and twenty-four in the ileum. Of these latter, six occurred in Meckel's diverticulum.

These tumors, arising in the muscle coats of the wall of the intestine, may grow either inward or outward. They do not tend to encircle the bowel wall in an annular fashion as carcinoma does. The majority, the so-called subserous variety, tended to grow into the mesentery, presenting a lobulated bulky appearance, although a few were pedunculated masses attached to the antimesenteric wall. In four cases, the extension was into the lumen of the bowel as a pedunculated or even a papillary growth, the so-called submucous type. The tumors were generally firm; on cross section, they presented a rather fleshy, homogeneous surface with areas of cystic degeneration. Most frequently the color was gray or red; occasionally it was yellow. Ulceration of the mucosa was not uncommon, as would be expected from the incidence of melena. In ten cases, gross perforation of the tumor was noted. A cystic area may have perforated into the general peritoneal cavity or the perforation was directly from the bowel lumen, through the tumor, and thus into the peritoneal cavity. In many cases, small hemorrhages into the substance of the tumors were present, being rather sizable in two instances.

The size of the tumors varied a good deal. The largest was 16x8x9 cm., and the smallest was 2.2x2.5 cm. Size is not necessarily related to prognosis. In one case, the tumor measured 3x2.5 cm. when resected. The patient was dead of massive recurrences 5 years later.

Intussusception was found in two cases. The tumors were small, almost entirely intraluminal and pedunculated. In ten cases, there was either local or distant metastasis or a spread of the tumor to other structures. Metastatic spread was usually by peritoneal implants or liver nodules and only rarely to lymph nodes; in none of these cases was there histologic verification of such nodal metastasis. Because of this, some authors consider that wide resection of tissue containing lymph nodes is probably not necessary.

Prognosis.—Most authors quote Klopp and Crawford²⁹ as indicating that the tumors are relatively benign and that early resection should afford excellent possibility of a cure. This is not necessarily true.

Postoperative deaths occurred in five cases (11 per cent mortality). In thirteen cases, the patients recovered from the operation but the subsequent course was not given in the report.

Eight patients died of their malignant disease from five months to fifteen years later. All of these patients except one (who survived six and one-half years) had had metastasis or local extension of the disease process at surgery. One patient manifested obvious signs of massive recurrence less than a year after operation. Another patient was alive but with proved metastasis nineteen years after the original operation. Seventeen patients were well and presumably free of their disease from six months to ten years after surgery. Starr and Dockerty, in a series of 41 patients with malignant tumors of this type, found that approximately 50 per cent of the twenty-eight who could be subjected to five-year follow-up survived 5 years or more.

In approaching the question from a different angle, it is found that of the ten patients with metastasis or extension at operation, one died a postoperative death, six died as a direct result of their disease, and three were alive and well at the time of the report; six months, twenty-three months and two years after surgery. Among the thirty-five patients without evident extension or metastasis, there were four postoperative deaths. One patient died of recurrent malignant tumors six and one-half years after surgery, and two were living with evidence of recurrent disease at the time of the reports as already mentioned. The other 14 about whom information was known were living and presumably well, six months to ten years postoperatively.

It is evident that the prognosis in general is only fair. However, an occasional patient lives for an astonishingly long time with known disease, and an attempt at resection should always be made even in the face of an apparently hopeless situation.

Treatment.—In one case, operation had not been done, the report being based on autopsy findings. In all the other cases, some type of surgical procedure was done. In forty cases, primary resection was done. In three of these forty cases in which the tumor had extended to or was adherent to the adjacent colon, resection of colon was done in addition. In two cases, the lesion was locally excised with closure of the open-

ing in the bowel. In the remaining two cases, biopsy of metastatic nodules was done with no resection being carried out.

Specific mention of x-ray therapy was made in only two cases. In one case, a patient with multiple masses in the omentum and visceral and parietal peritoneum, who had had biopsy only, the palpable masses disappeared under therapy only to return in six months, the patient dying two years after the therapy. In the other case, in which a mass was noted five months postoperatively, the gradual enlargement of multiple masses was apparently not influenced and the patient died fourteen months after operation.

Case Reports

Case 1.—R. C., a white housewife, fifty-one years old, was admitted to the hospital for the first time on April 17, 1949, for drainage of a rectal abscess. Besides the complaints related to the abscess, for about one year she had noted attacks of a feeling of fullness in the lower abdomen, accompanied by colicky lower abdominal pain and often relieved by a bowel movement. A number of years before, she had had a diagnosis of duodenal ulcer confirmed by x-ray, and still had occasional mild episodes reminiscent of this disorder. Ten years prior to admission she had had an appendectomy and right oöphorectomy for an ovarian cyst. She had had no menstrual flow for one year until a month prior to admission when she had two days of a slightly sanguineous flow. The past history and systemic inventory were otherwise non-contributory.

Her blood pressure on entry was 146/88; temperature, pulse and respiration were normal. She appeared comfortable and in good health and nutrition. A complete general physical examination was negative except for the following: a typical, quiescent fistula-in-ano; on pelvic examination, the uterus was anterior and mobile and normal in size and shape. The right adnexa were free. In the left adnexa was a rounded mass, approximately 8 x 6 cm., which was felt to be an ovarian cyst.

Hemoglobin was 14.6 gm. per cent; leukocytes 7.500. Routine urine examination was negative. Fluoroscopy showed a normal esophagus and stomach, with a slight deformity of the duodenal cap, which was felt to be secondary to scarring, without evidence of an ulcer crater. There was normal distribution of the meal at four hours.

On April 19, 1949, surgery was performed for the anal fistula, and the patient pursued an uneventful course following this procedure.

On April 26, 1949, abdominal exploration was performed through a low midline incision. The pelvic organs were entirely normal. Further search revealed a deep-red, soft, loculated mass about 8 cm. in diameter in the ileum. The mass involved only a small area of mesenteric border of the bowel wall, and was, in fact, almost entirely mesenteric in location. The lumen of the bowel had been encroached upon only very slightly. Resection of the mass was carried out, including about

one foot of ileum and a deep V-shaped segment of mesentery, and an end-to-end anastomosis was performed. There was no gross evidence of regional or distant metastasis.

The pathological report was as follows: "Examination of the specimen showed a segment of small bowel, 29 cm. long, that is not dilated. A nodular, congested, fleshy tumor, 8x6.5x4 cm. arises from the outer surface of the wall of the bowel and the adjacent mesentery; it is attached by an area about 3 cm. in diameter and is pedunculated. The tumor seems to replace the muscle layers of the bowel where it is attached, but is covered on the inside by normal mucosa. Part of the center of the mass is cystic and contains blood clots. The tumor is otherwise fleshy and very soft on section. Microscopically, the tumor is made up of rather closely packed rounded and oval nuclei, with indistinct separation of their cytoplasm. There is moderate variation in nuclear size and an occasional mitotic figure. In some regions the cells become spindle-shaped and strongly suggest smooth-muscle formation. Diagnosis: Leiomyosarcoma of the ileum."

The patient's postoperative course was entirely uneventful, and she left the hospital on May 6, 1949, ten days after her abdominal operation. A course of deep x-ray therapy was given to the lower abdomen immediately postoperatively over a period of twenty-five days.

About one year postoperatively, she began to have indigestion suggestive of gall-bladder disease, and this diagnosis was confirmed by roentgenographic evidence. Surgery was advised, with the thought of removing the gall bladder as well as taking a "second look" at the site of the previously removed tumor. On exploration, the site of the previous intestinal anastomosis and the adjacent mesentery were entirely normal and free of recurrent tumor tissue; however, on careful scrutiny of the omentum, three tiny, hard nodules were found, each measuring 2 mm. in diameter. On microscopic examination, these proved to be recurrences of the tumor. There were no other recurrences found anywhere within the abdomen. The gall bladder contained a number of small stones, and it was removed. The common and hepatic ducts appeared to be normal. Convalescence from this operation was uneventful.

The patient remained well until the fall of 1951 (two and a half years after her first operation) when she developed massive recurrences throughout the abdomen, with right pleural effusion. A further course of x-ray therapy was given at this time without apparent benefit. The patient went very slowly and miserably downhill over the next year and died on December 17, 1952, three and a half years after the original removal of the lesion.

Case 2.—P. S., a white man, fifty-one years old, was admitted to the hospital on December 31, 1948, with a complaint of lower abdominal pain of three days' duration, cramping in nature and temporarily relieved by a bowel movement. His past history was irrelevant except for a hemorrhoidectomy one year previously and the finding of diverticulosis of the sigmoid colon at that time.

The admission temperature was 100.4°F., the pulse 88 and the blood pressure 126/80. The patient appeared acutely ill and complained of severe pain in the left lower abdomen. General physical examination disclosed pronounced left-rectus spasm with severe tenderness which was fairly diffuse throughout the left lower quadrant. Rebound tenderness was elicited in this area. The right side of the abdomen was normal. No masses were made out. Rectal examination was negative. The leukocytes numbered 16,300, with 68 per cent neutrophils, 24 per cent lymphocytes, 7 per cent monocytes and 1 per cent eosinophiles. Routine urinalysis was essentially negative.

It was felt that the patient had an acute diverticulitis with probable slow perforation. Conservative treatment was elected. The patient was started on a residue-free diet, large doses of penicillin and streptomycin parenterally and sulfasuxidine by mouth. Continuous hot stupes were applied to the abdomen. The next morning continuous nasal suction was instituted.

The patient's course was rather stormy for the first few days. The leukocyte count varied between 14,800 and 18,900. At the end of the first week the leukocytes had fallen to normal levels and remained so. Urine specimens were normal. A serum amylase determination was normal. Stool examinations and cultures were negative. A flat roentgenogram of the abdomen two days after admission showed a small collection of gas in the peritoneal cavity lateral to the hepatic flexure of the colon, which was felt to be in an abscess. There was no evidence of bowel obstruction.

On the fourth day, the nasal tube was removed and the patient was started on gradually increasing oral intake. Aureomycin had been substituted for the penicillin on the second day. There was some right upper quadrant tenderness as well as that noted on the left side of the abdomen. At the end of the first week, only moderate tenderness persisted. There was considerable malaise and ill-defined abdominal distress. X-rays of the abdomen on the sixth day had shown no evidence of the tiny collection of air previously noted. On the eleventh day x-rays showed a very minute collection of free gas in the right side of the abdomen at the level of the lower margin of the liver. Proctoscopic examination three weeks after admission was negative. The patient left the hospital on the twenty-fourth day free of distress. His only symptoms were moderate asthenia and anorexia.

On February 9, 1949 (seventeen days after discharge and forty days after onset of symptoms) colonic fluoroscopy was done, the following report being made: "Diverticulosis at the juncture of the descending and upper sigmoid colon. There is some irritability of the colon in this area with localized tenderness. The findings are consistent with a subsiding diverticulitis. The appendix is retrocecal but otherwise normal."

After discharge from the hospital, the patient felt well in general, slowly gaining in strength and in appetite. He was relatively free of abdominal symptoms until three months after the first episode when he again noted rather abrupt onset of quite severe sharp pain in the lower abdomen with findings exactly similar to those preceding the previous admission. He was taken to the

hospital where a leukocyte count was 12,000 with 81 per cent neutrophils, 19 per cent lymphocytes. The neutrophils showed toxic changes. Flat x-ray films of the abdomen were negative.

The pain increased rapidly, his temperature went to 101 degrees, the abdomen became rigid, and it was obvious that an acute abdominal condition existed. A diagnosis of a probable perforating diverticulitis was made and a loop transverse colostomy was done. At that time the entire abdomen was sealed off by what appeared to be a peritonitis, and no attempt was made to break through these adhesions. Supportive therapy included antibiotics and multiple transfusions of blood. His convalescence was slow, but progressively favorable.

About two weeks after dismissal from the hospital, he began to have indications of a localizing process in the right lower quadrant of the abdomen which in about ten days began to "point," and drainage was felt advisable. On making a small incision in the area, much foul, purulent material, gas and feculent material were obtained. The incision was enlarged. Instead of an abscess, a large tumor was found occupying an intramesenteric location in the jejunum, involving two loops of intestine. The capsule of the tumor was very thin and had already ruptured. Diverticulitis of the sigmoid colon was present but was obviously not the cause of the situation. Massive resection of the tumor, mesentery and adjacent intestine was done, with end-to-end anastomosis. There was no evident hepatic metastasis or gross implants on the peritoneal surfaces.

The pathologic report was as follows: "55 cm. of small intestine and portion of mesentery. Weight 1300 grams. In the mesentery and arising either from the mesentery or from the muscularis of the small intestine there is a lobulated, poorly encapsulated, necrotic mass measuring 18x18x12 cm. There is no connection between the centrally degenerated portion of the tumor and the lumen of the small intestine, but the lumen of the latter is markedly narrowed at several points. Diagnosis: Leiomyosarcoma of the jejunum."

Because of the likelihood of implants, he was given a course of deep x-ray. The patient's convalescence following this was rapid and free of untoward incident. Operative closure of his colonic stoma was carried out two months later. At this time, it was impossible adequately to explore the entire abdomen, but there was a nodule attached to the epiploic tags of the distal portion of the transverse colon. This was excised, and pathological examination showed it to be a leiomyosarcoma identical with that originally removed.

The patient gradually gained in strength for a short time, but soon multiple masses appeared throughout the abdomen, and he was given a further course of deep x-ray therapy. This appeared to have little, if any, effect on the relentless progression of the disease, and he expired one year from the onset of initial symptoms.

Summary

1. Forty-five cases of leiomyosarcoma of the jejunum and ileum in the literature were studied and are summarized; thirty-one patients (75 per cent) had abdominal pain, twenty (44 per cent)

had gross hemorrhage, seventeen (38 per cent) had a palpable mass, sixteen (36 per cent) had either acute (eight cases) or chronic (eight cases) obstruction and five (22 per cent) had the clinical picture of a perforating lesion. They are seen at any age, but most frequently in the middle years. The diagnosis is very difficult, small bowel tumor having been diagnosed only three times. Treatment is surgical resection; apparently the usual wide excision of lymph-node-bearing areas is not necessary. X-ray therapy holds little promise. Prognosis is very poor where there are local extensions or implants and fairly good (perhaps 50 per cent survival) where there are not.

2. Two personal cases of leiomyosarcoma, one of the jejunum and one of the ileum are presented. The clinical picture in one was that of a very mild intermittent intestinal obstruction with a pelvic tumor, and in the other that of a perforating intra-abdominal lesion.

Comment

Three points concerning the nature of this disease deserve emphasis.

In the first place, the microscopic picture of this tumor is not necessarily an indication as to its degree of malignancy. Indeed, in many cases it will not even indicate whether the tumor is malignant or not. Many pathologists will not render an opinion as to whether this tumor is malignant until metastasis, implantation or direct extension of the tumor appears. Consequently, it is possible that many leiomyosarcomas recorded as being surgically cured undoubtedly could have been benign to start with, which would certainly affect the percentage of cures in the treatment of these tumors.

The second point to be emphasized is the bizarre clinical features that may be present. Symptoms of small-bowel tumors frequently are so obscure that no reason exists to suspect them. For instance, in one of the cases presented, the predominant features of the clinical picture were masked by the presence of diverticulitis and, in retrospect, one probably would have recommended laparotomy at the onset of the first symptoms because suspicion might well have been focused on a small-bowel tumor. This would have been of great therapeutic significance since it would have given an earlier chance of surgical attack. In the other case, likewise, the clinical picture simulated a gynecological disorder and no suspicion whatever

was entertained as to the presence of a small-bowel tumor. This woman's pain was in the left side of the pelvis. Bimanual examination disclosed a mass in the region of the left adnexa. Laparotomy revealed a tumor of the small bowel behind and to the left of the uterus. It had prolapsed into this area and could not be distinguished by examination from a tumor of the ovary.

The last, and probably the most important point, is the value of a second, third or even fourth look into the abdomen in certain cases of malignant disease. This is particularly applicable in leiomyosarcoma of the small bowel. In this rare tumor, spread of the disease is either through the blood stream or by peritoneal implantation. Because spread is practically never to the lymph nodes, adequate surgical excision of the tumor in the absence of hepatic involvement should be sufficient, and dissection of lymph nodes is not necessary. Consequently, when metastasis is not evident and the tumor can be resected, one would be justified in recommending repeated subsequent laparotomies in an attempt to obtain a cure. This principle probably should be applied also in all cases of leiomyomas of the small bowel. Regardless of the fact that these tumors may look microscopically benign, it is well known that they may produce metastasis and implants.

The importance of repeated laparotomies is illustrated in one of our patients. Fifteen months after removal of the original tumor, this woman experienced symptoms typical of gall-bladder disease, and this was substantiated by x-ray findings. Laparotomy was done, with the idea of both removing the gall bladder and taking a second look. After the gall bladder was removed, thorough exploration of the abdomen disclosed the afore-mentioned recurrent tiny nodules of tumor on the greater omentum. In retrospect, it might have been wise to advise a third look six to twelve months after the gall-bladder operation and two and a half years after the original resection with the idea of removing any implants or extensions at that time.

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The Clinical Problem of Syphilis Today

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THE PROBLEM of syphilis today has changed in character from the problem it presented about a decade ago. At that time, the basic facts of diagnosis and epidemiology were recognized and the paramount problems were those of treatment and sterilization of infective foci. With the introduction of penicillin as an antisyphilitic drug, these paramount problems were largely solved, a fact which accounts in no small measure for improved morbidity rates of syphilis. By no means do we wish to imply that clinical syphilis is no longer a problem with which to deal; we are merely stating the fact that emphasis on the diagnosis and treatment of early syphilis has changed.

Today, the problem of syphilis is chiefly concerned, in the absence of early syphilis, with the evaluation of positive serologic tests for syphilis.* Dermatologists are requested to evaluate such reactions; they are asked to classify them as representative of a syphilitic infection, either active or inactive, or as an apparently nonspecific biologic reaction. With the decrease in the number of cases of syphilis seen, there is an increase in the proportion of these nonspecific reactions. While the ever-increasing refinement and sensitivity of serologic tests have been developed, the specificity of the tests has also been improved. There is some evidence to support the belief that these improvements have altered the ratio of nonspecific tests to specific tests.

In an effort to better appreciate the problem of syphilis today, the records of all patients for

whom a positive serologic test for syphilis was obtained at the Mayo Clinic laboratories during the year 1955 were reviewed. The records of 1,559 patients were studied. The results are given in Table I, and the cause for the positive serologic tests as recorded in the history will be discussed.

TABLE I. DISTRIBUTION OF 1,559 PATIENTS IN WHOM SEROLOGIC TESTS FOR SYPHILIS WERE FOUND TO BE POSITIVE DURING 1955

Group	Diagnosis	Patients	
		Number	Per Cent
1	Old syphilis, seen previously at the clinic	378	24.2
2	Previous syphilis, first visit to the clinic	340	21.8
3	Syphilis discovered for first time (1955)	176	11.3
4	Nonspecific reactions	282	18.1
5	Undecided with reference to syphilis	94	6.0
6	No action taken	272	17.5
	Disregarded	15	1.0
	Transfer of reagins	2	0.1
Total		1,559	100.0

A VDRL test was first performed on these patients, followed by a standard Kahn test if the VDRL test was positive. In almost all instances, the patient was returned, either the next day or shortly thereafter, and a battery of tests, consisting of a VDRL test, a standard Kahn, a Hinton, and a Kolmer-Wassermann, was performed. In some cases in which syphilis was suspected or known or if there was some other reason, the battery of four tests was performed at the outset. In view of the fact that the validity of the conclusions in this paper necessarily rests on the accuracy of the tests, it should be noted that the serologic laboratory performing the tests has stood in the top group of serologic laboratories which voluntarily submit to an evaluation study by the Minnesota State Board of Health in conjunction with the serologic laboratory of the United States Public Health Service at Chamblee, Georgia. During the year covered by this paper, the laboratory performed 576 tests on unknown test sera. The results reported by the laboratory were correct in every instance except one. In this instance, a report of a "weakly reactive" Kahn test should

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*It should be understood that the expression "serologic tests for syphilis" is a vernacular expression. It refers to tests performed with an antigen prepared from beef hearts. "Positive" and "negative" results would more correctly be referred to as "reactive" and "non-reactive." If these facts were kept in mind, less confusion would exist with reference to these tests.

TABLE II. THE TYPE OF SYPHILIS PRESENT IN 176 PATIENTS NOT PREVIOUSLY RECOGNIZED AS HAVING THE DISEASE

Type of Syphilis	Patients	
	Number	Per Cent
Latent	129	73.3
Central nervous system	26	14.8
Cardiovascular	6	3.4
Gumma	2	1.1
Optic neuritis	1	0.6
Prenatal	10	5.7
Undetermined	2	1.1
Total	176	100.0

have been reported as a "reactive" Kahn test. Of the eighty-four unknown paired specimens, the correct report was made in every instance.

Data

Patients with positive tests were categorized in one of six groups (Table I). The first group consisted of patients previously seen at the clinic in whom the diagnosis of syphilis had been established at some previous time. They were being seen at this time for follow-up of their syphilis or were referred for follow-up as part of a general examination. In some instances, patients within this group had been observed periodically for twenty-five years or more. There were 378 patients in this group, which we have termed "definite old syphilis of known duration," and they represent 24.2 per cent of the total number of patients studied.

The second large group consisted of those patients (1) in whom a diagnosis of syphilis had been made previously elsewhere, (2) who were seen at the clinic for the first time, and (3) in whom the diagnosis of syphilis was confirmed at the clinic. There were 340 patients (21.8 per cent) in this second group.

The third large group consisted of patients in whom the diagnosis of syphilis was made by us, and for the first time. This group contained 176 patients (11.3 per cent) and included representatives of all stages of the disease except early syphilis (Table II). The patients with latent syphilis and most of those with the late types of syphilis were patients originally registered in a general section of the clinic and were seen by a consultant in the Section of Dermatology because they had a positive blood test on routine testing. In only a few instances were such patients seen first by the dermatologists, and, then, not because the patient knew he had syphilis, but rather that he had some unusual skin disease, the etiology of which was

not recognized elsewhere and which had not been amenable to care at home. The division of these patients into their respective stages of syphilis was as follows: latent, 73.3 per cent; late, 19.9 per cent; prenatal, 5.7 per cent (Table II).

The fourth group in Table I consisted of those patients with a positive serologic test for syphilis who were considered to have a "biologic false positive" (nonspecific) reaction. The phrase "biologic false positive" is one of the most unfortunate terms to have been applied to any laboratory test. If one eliminates the tests which result in positive readings through faulty technique, incompetent reagents, incompetent technicians and stenographic errors, there is nothing biologically false about positive serologic tests which occur in patients in whom the diagnosis of syphilis cannot be made, from a study either of the history or of their physical findings. These tests are in every sense of the word biologically *true* positive tests. Their meaning is still obscure. They should be termed "syphilitic false positives." Patients have been diagnosed by competent dermatologists when first seen as having biologically false (nonspecific) reactions, only to have them return years later when an unquestionable diagnosis of late syphilis has been made. It must therefore be clearly recognized that a certain number of so-called nonspecific reactions, or what we would like to term "biologically *true* positive reactions," occur in patients with syphilis in whom the diagnosis cannot possibly be made. It is possible that some of the newer serologic tests employing antigens made of *Treponema pallidum* may in time unravel this puzzle. This paper, however, does not deal with this particular problem, important as it certainly is.

It should, however, be noted that whereas there appears to be a certain correlation between positive serologic tests and lupus erythematosus, infectious mononucleosis, certain viral infections and vaccination with cowpox virus, only a relatively small percentage of patients with these conditions (except acute systemic lupus erythematosus) exhibit positive serologic reactions.

There are also a number of so-called nonspecific reactions which occur in patients with other diseases, such as malignant lesions, upper respiratory infections and arthritis. One must not forget, however, that the vast majority of patients with these diseases do not exhibit positive

serologic reactions and by no statistical connivance can one show a positive correlation between nonspecific reactions and these diseases. Certainly, to prove that these diseases cause positive serologic reactions will take a large volume of data, so far absent from the literature.

Two hundred and eighty-two patients were classified as having nonspecific reactions and accounted for 18.1 per cent of the 1,559 patients in whom positive reactions were observed. Within this group were included only those patients in whom the nonspecificity of the test was recognized at the time the patient was seen. This fact was recorded in the history but was not always stated on the patient's chart. Table III gives the supposed causes of the nonspecific reactions seen among this group of 282 patients.

It should be pointed out that there are undoubted cases of syphilis in our series in which only one of a battery of tests was positive. In such cases, the clinician must exercise his keenest acumen. Old "burned-out" cases of syphilis and treated patients not infrequently display such inconclusive results in serologic tests.

The next group in Table I consisted of ninety-four patients (6.0 per cent) in whom we could not decide whether the positive serologic test represented a specific reaction for syphilis or a nonspecific reaction. On the one hand, we could not establish a diagnosis of syphilis by the usual means of a history, signs and symptoms; nor could the reverse be proved, that a cause other than syphilis existed to account for the nonspecific reaction. It was within this group that additional follow-up was suggested and the patient was asked to return, or the referring physician was advised of the situation. Because of the time element concerned with repeated serologic tests at intervals, the eventual diagnosis of some of these patients has not been reached. If a patient initially seen had an unexplained positive serologic test and subsequent follow-up indicated that this was a nonspecific reaction, that patient is included with the previous group of nonspecific reactors.

The sixth large group of patients in Table I includes those whose serologic tests for syphilis were positive, but on whom the clinician took no definite action. Included are a considerable number of patients with weakly positive serologic tests for syphilis, the occurrence being mentioned by the clinician, but apparently considered of no

TABLE III. THE SUGGESTED CAUSE OF THE POSITIVE SEROLOGIC TESTS OR CONDITION PRESENT IN 282 PATIENTS WITH NONSPECIFIC REACTIONS

Diagnosis	Patients	
	Number	Per Cent
Lupus erythematosus, systemic	35	12.4
Lupus erythematosus, discoid	4	1.4
"L.E." aproline reactions	2	0.7
Virus infections (smallpox vaccination, varicella, and herpes simplex)	21	7.4
Malignant lesions	15	5.3
Upper respiratory infections	14	5.0
Arthritis	11	3.9
Infectious mononucleosis	1	0.4
Undecided	179	63.5
Total	282	100.0

significance to the patient. There was a group of patients included with positive serologic tests for syphilis, who had a serious systemic disease, in most instances a malignant lesion. Included in this group were patients in the older age groups (that is, more than sixty years of age) whose positive tests were disregarded, because of age and lack of objective findings for syphilis. There was also a small group of patients with strongly positive serologic tests for syphilis, who, it appears on study of their records at this time, may indeed have had syphilis. Two hundred and seventy-two patients (17.5 per cent) are included in the sixth group.

There was a small group, fifteen patients, with advanced age in whom a positive serologic test was found for the first time. It was considered that because of their advanced age without a history of syphilis and without the clinical signs and symptoms of the disease, it was not worth while to spend time or put them to the expense of running a battery of serologic tests to establish the presence of a disease that would have no clinical significance.

In two infants, the positive serologic test was due to transfer of reagins.

Comment

Syphilis as a disease to be considered in differential diagnosis is receiving less and less attention. This trend is due primarily to the results of efforts of physicians and public health officials in the eradication of this formerly prevalent disease. While a tremendous reduction in the incidence of syphilis has taken place, the disease is by no means eradicated and physicians and public health officials must be ever alert to the possibility that syphilis may still produce disability, financial ruin, dementia, and death.

Some idea of the reduction in the incidence of syphilis together with its more serious manifestations may be gained from the figures of Barnouw and Clark,¹ who cited the following achievements of penicillin therapy. The mortality rate from syphilis has dropped from 11.1 per 100,000 population in 1939 to 3.7 per 100,000 in 1952; the infant mortality rate from syphilis has dropped from 0.57 per 1,000 live births in 1939 to 0.02 per 1,000 live births in 1952; the admission rate of the syphilitic insane to mental institutions has dropped from 6.6 per 100,000 population in 1939 to 2.1 per 100,000 in 1951.

Beerman and associates,² in their review of syphilis recently published, take cognizance of the foregoing facts, and in addition review all recent advances in the field of syphilology. We would agree with them that syphilis no longer plays a dominant role in clinical medicine. Yet, because of the infrequency of seeing clinical syphilis, the diagnosis of syphilis is omitted from consideration in the differential diagnosis of patients with obscure signs and symptoms.

Of the 1,559 patients at the clinic whose records were reviewed in the present paper, 894 were definitely diagnosed as having syphilis. When the records at this time of writing are considered, it seems apparent that an additional thirty-five patients not previously classified had the disease. These two groups accounted for 59.6 per cent of the total number studied. However, since a decision was reached with reference to syphilis in only 1,178 of the 1,559 patients, actually 79 per cent of those with positive serologic tests were diagnosed as being syphilitic.

The 176 patients of Group 3 were recognized for the first time as having syphilis. We do not wish to discuss the value of routine blood testing to discover this reservoir of undiscovered syphilis, since this subject has been adequately discussed elsewhere.³ The total of 929 patients diagnosed as syphilitic represents 0.6 per cent of the total clinic patients seen in 1955.

The patients whose positive tests represent a nonspecific reaction (Group 4) account for a substantial proportion of the patients in our series. It should be observed that, in many of these patients, our battery of tests revealed only one test or sometimes two tests as being but weakly positive. Such tests are extremely difficult to evaluate. Whether these tests should be included at all in a series of even "nonspecific reactions"

could well be debated. The recent article of Beerman and associates² emphasized the need for the clinician to be aware of the causes of such reactions. It has been our frequent experience that the finding of a positive serologic test for syphilis in a young adult woman with no history of an actual syphilitic infection may be taken as a premonitory sign of systemic lupus erythematosus. A number of references on this subject of nonspecific reactions are included in the article by Beerman and associates.²

Our method of deciding that positive serologic tests at any one time represented specific infection consisted of a review of the patient's medical history in an effort to discover diseases that might account for the positive serologic tests. General and neurologic examinations were performed. It was necessary to follow the serologic tests at monthly intervals. However, sometimes a three-month period elapsed before the test was rechecked. In the absence of definite evidence of syphilis and the presence of tests which were rapidly reverting to, or had become, normal in a few months, a diagnosis of a nonspecific reaction was made. Since the *Treponema* immobilization test and the other more specific tests were not available for routine use in these patients, the decision that a reaction was nonspecific had to be made without the benefit of these laboratory aids.

Although we cannot say that the nonspecific reactions are the most important among the group of positive tests observed certainly they are the ones which hold the clinician's interest because of the desire to discover the presence of some other systemic disease. Their relative importance can be appreciated from a numerical standpoint when it is realized that we observed nonspecific biologic reactions in 282 patients, in comparison to positive tests in 929 patients in whom syphilis was diagnosed. However significant nonspecific reactions may be, it is still important to realize that in most instances a positive serologic reaction indicates syphilis.

Time was the factor which made it impossible for us to decide whether some patients in Group 4 should actually be a part of Group 3. Among patients who live in close proximity to the clinic, this will be accomplished by subsequent follow-ups. In many, however, the patient could not return, so that the responsibility of evaluating the patient was left in the hands of the referring phy-

cian. In our tables, however, patients in this category are classified as not being diagnosed (Group 5). The *Treponema* immobilization test or some other more specific test might have been of value in these cases.

The figures which have been presented, being from a clinic practice in which most patients travel some distance for care, cannot be compared with a more local type of practice. For instance, we did not see a single case of early syphilis during the year 1955, a situation which, although typical for our practice during the past five years, would be unusual in a larger metropolitan area.

Appended are the short histories of five patients recently observed, who illustrate some of the problems seen in syphilis today.

Report of Cases

Case 1. Early Syphilis.—A nineteen-year-old single man came to the clinic during June, 1954, because of a persistent sore throat and "glands" in the neck, axillae, and groins of two months' duration. Only incidentally did he wish anything done for an asymptomatic eruption of his palms and soles that had been present for two and one-half months.

He was referred to the Section of Dermatology for evaluation of his skin, where the barely perceptible rose-pink macules and maculopapules of the palms and soles were seen. Some of the lesions presented small puncta centrally. In addition, there was a moth-eaten appearance to the fringe areas of the hair, rather marked pharyngeal injection with hoarseness, and generalized lymphadenopathy. There was no history of a primary lesion despite adequate exposures. His serologic tests for syphilis were reported as positive.

The patient was given 6,400,000 units of penicillin intramuscularly in divided doses for ten days. Within forty-eight hours, the throat was asymptomatic and the lesions of the palms and soles had faded. After a week of treatment, hyperpigmentation was noted at the sites of the previous skin lesions.

A recheck of the patient's condition eighteen months later revealed the serologic reactions to be negative and the cerebrospinal fluid normal.

Case 2. Late Cutaneous Syphilid.—A sixty-year-old divorced woman presented herself at the clinic during November, 1954, requesting treatment for "varicose veins" of the legs and arms. For twenty years this patient had experienced tender erythematous nodules and plaques of the left leg and arm, which would ulcerate for nine to twelve months and then heal with superficial scar formation.

With the onset of the skin lesions, she had polyarthritis characterized by red, swollen, painful wrists, ankles and knees. Most severely involved was the left knee, with subsequent involvement of the left hip. With the extension of the skin lesions about the left knee, stiffness of this joint occurred and the patient walked

with a limp. Deformity of the ankle subsequently occurred and progressed so that when the patient was seen at the clinic she had difficulty in walking with the aid of crutches. She denied ever having had syphilis.

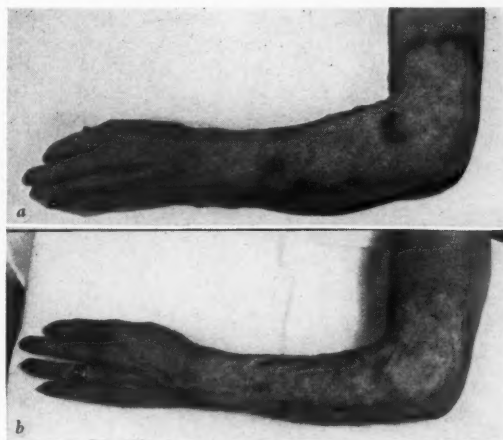


Fig. 1 (Case 2). Cutaneous syphilid. (a) Before treatment. (b) Healed lesions three months after treatment totaling 12,400,000 units of penicillin.

Her examination revealed almost circumferential cutaneous granulomatous processes of the left leg from the ankle to the hip and of the left arm from the wrist to the mid-upper arm (Fig. 1a). A plaque, 12 cm. in diameter, was present over the lateral surface of the right upper arm. Dusky-red nodules 0.5 to 3 cm. in diameter coalesced to form arcs and annular plaques, which studded the periphery of the involved areas. Some of the nodules had ulcerated, and adherent ostraceous crusts were present. More centrally in location where the process had resolved, the skin and subcutaneous tissue had atrophied.

Involvement of the deeper structures of the left leg resulted in a peroneal and anterior tibial palsy with contractions of the gastrocnemius and posterior tibial tendons that pulled the foot and ankle into the severe fixed equinovarus position. Complete extension of the knee was impossible.

The patient's serologic reactions for syphilis were positive, and the cerebrospinal fluid examinations were negative. The diagnosis of an ulceronodular syphilid was made, and was confirmed by the histopathologic pattern at biopsy of a specimen of skin.

Treatment was instituted with penicillin, 12,400,000 units being administered intramuscularly in divided doses over a twenty-day period. Involution of the skin lesions occurred promptly (Fig. 1b). During this time, operation was performed for correction of the foot deformity.

Case 3. Late Syphilis Involving Skin, Bone, and Eye.—A fifty-two-year-old woman came to the clinic in June, 1955, for a skin condition, which had been present for twenty years, and blurred vision of the left eye, which had been present for six weeks.

Her skin problem had begun in 1935, when superficial erythematous scaling plaques, 2 to 3 cm. in diameter, developed over the nose. These plaques would persist for six to eight months and then resolve with

creased difficulty in walking and keeping his balance, especially in the dark, which had been present for six months, numbness of the legs for several weeks, and urinary retention during the past fourteen days.

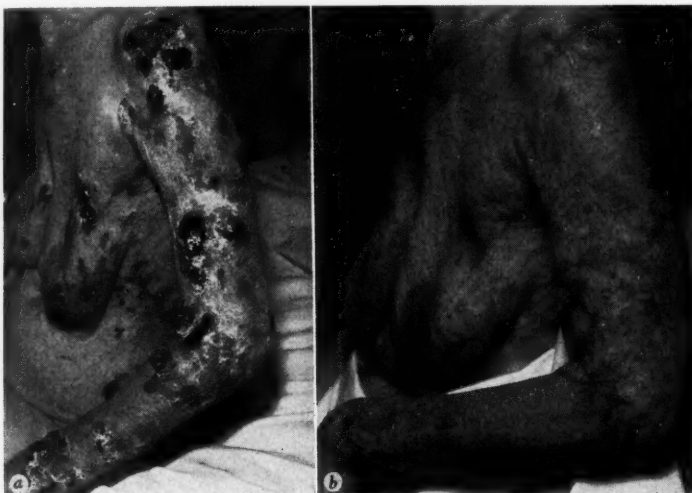


Fig. 2 (Case 3). Ulceronodular syphiloderm. (a) Before treatment. (b) Six months after 10,600,000 units of penicillin.

superficial scar formation. Similar lesions had appeared on the rest of the body within the past year. Beginning in 1948, the patient had intermittent pain in both feet relieved by adequate rest and supportive boots. The patient readily gave a history of inadequately treated primary syphilis in 1918, when she had been fifteen years of age.

On admission, she presented a generalized eruption, most marked on the extremities. The eruption consisted of plaques with irregularly scalloped erythematous nodular borders. The central area of these plaques showed thin atrophic scars, the sequelae of lesions that had involuted. Ulcerations were present, some involving the scar tissue and others the nodules (Fig. 2a).

Examination of the left eye showed uveitis characterized by an irregular fixed pupil, a cloudy cornea, and keratotic precipitates on the endothelium. Roentgenograms of the feet showed osteoporosis, gummatous involvement and destructive changes in the bones such as are found in syphilis. Her serologic tests for syphilis were positive. The Kolmer test on the cerebrospinal fluid was positive, but the fluid otherwise was normal.

A diagnosis of late cutaneous, osseous and ocular syphilis was made. After the patient was prepared with bismuth, 10,600,000 units of penicillin were administered intramuscularly in divided doses over a twelve-day period.

When the patient was seen for recheck six months later there was healing in all systems (Fig. 2b). A second course of 10,000,000 units of penicillin was given over a ten-day period.

Case 4. *Tabes Dorsalis*.—A fifty-seven-year-old man was admitted in September, 1954, complaining of in-

creased difficulty in walking and keeping his balance, especially in the dark, which had been present for six months, numbness of the legs for several weeks, and urinary retention during the past fourteen days.

He had previously been seen in 1925, when he was twenty-seven years of age. At that time a diagnosis of early central nervous system syphilis had been made on the basis of a positive serologic test for syphilis and an increased cell count in the cerebrospinal fluid. He had had a primary lesion of syphilis in 1919. The patient did not complete the treatment recommended nor did he respond to follow-up inquiries.

Physical examination revealed a well-nourished man, past middle age, unable to walk and unable to stand without support. He had Argyll Robertson pupils, absent patellar and Achilles tendon reflexes, loss of testicular and Achilles tendon pain, loss of vibratory sense of the legs and a positive Romberg test.

The patient's serologic tests for syphilis were positive, and the cerebrospinal fluid examination showed a positive Kolmer reaction and an elevated protein and cell count.

The patient was given 12,000,000 units of penicillin intramuscularly over a thirty-day period. Recheck of this patient six months later showed that there had been no essential changes in his clinical or serologic condition, but his cerebrospinal fluid had become inactive.

Case 5. *Gumma*.—A fifty-four-year-old man had had an ulceration of the right side of the soft palate for three months before he was seen at the clinic in May, 1955, for a questionable malignant lesion.

Because routine VDRL and Kahn tests were positive, the patient was referred to the Section of Dermatology for evaluation. He denied knowledge of ever having had any venereal disease.

(Continued on Page 736)

Testicular Tumor

Metastatic from Hypernephroma

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RENAL tumors, despite all that has been written, still prove to be problems taxing the diagnostic acumen and skill of even the most experienced urologist. Deming⁶ refers to them as "an enigma and a challenge." Creevy⁵ states that malignant renal tumors should be classed with syphilis and tuberculosis as among the great mimics encountered in clinical medicine. By direct pressure, by necrosis or hemorrhage, by extension or by metastasis, they can reproduce clinical appearances of an amazing variety of disorders. This fact is often mentioned but rarely emphasized in discussions of renal neoplasms. A review of the types and methods of metastasis seems necessary to explain some of the bizarre manifestations presented by renal tumors and their metastases.

Renal neoplasms and their metastases have simulated such a large and unrelated variety of disorders that an orderly classification is difficult. For convenience, the following arrangements have been employed:

1. Metastasis to the osseous system.
2. Metastasis to the lungs and pleura.
3. Metastasis to the digestive tract.
4. Metastasis to the female genitalia.
5. Metastasis to the neck.
6. Metastasis to the skin.
7. Metastasis to the central nervous system.
8. Metastasis causing anemia.
9. Metastasis causing fever.
10. Metastasis simulating other disorders of the urinary tract. The osseous system is most involved.

The methods of metastasis of malignant growths are several⁷:

1. Extension to secondary site by continuous extension.
2. Implantation or transfer of malignant cells by contact is infrequent, but does occur on occasion, such as kissing, malignancies of the anterior and posterior walls of the stomach, vulva and bladder.
3. Spread by lymphatic chain is a very important

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route, particularly for carcinoma. It is less common for sarcoma to metastasize in this fashion.

4. The blood stream is the most frequent route for spread by sarcomata. This is true because this type of growth has the unusual structure of thin blood vessels and naked blood sinuses with a tendency to necrosis and hemorrhage rather than fibrosis. Ewing explains blood vessel metastasis as follows:

- (a) By direct vessel invasion and spread along the vessels.
- (b) Secondary and interstitial embolism.
- (c) Retrograde transport.
- (d) Paradoxical embolism (intracardiac communication of the right and left sides of the heart, thus bypassing the lungs).
- (e) Passage of the thoracic duct which joins the large veins of the neck and upper thorax.

Hypernephroma, however, does not follow the general rule of carcinomata with spread via the lymphatic system. It is characteristic of hypernephroma to metastasize via the blood stream. McDonald and Priestly,⁹ in a series of 509 cases, found malignant thrombosis of the renal vein to be present in 54 per cent of the cases of hypernephroma. Therefore, it is quite simple to understand the usual metastasis to the lungs.

Metastatic lesions which appear to have bypassed the lungs are another problem, however, and mechanisms responsible for this will be discussed later.

Nomenclature

Considerable confusion and disagreement exists as to histologic types of renal tumor. A great number of classifications have been reported in the literature. The following from Bell³ seems to be the simplest and yet all-inclusive.

- A. Connective tissue tumors
 1. Fibroma
 - (a) cortical
 - (a) medullary
 2. Lipoma
 3. Leiomyoma
 4. Hemangioma
 5. Tumor associated with tuberous sclerosis
 6. Sarcoma

B. Epithelial Tumors

1. Adenoma

- (a) papillary cystadenoma
- (b) solid adenoma (small hypernephroma)

2. Adenocarcinoma (hypernephroma)

C. Wilms' tumors

D. Tumors of the renal pelvis

For purposes of the scope of this paper and of simplicity, the connective tissue tumors will not be discussed further. They are rare, or are so small as to produce no symptoms, and, with the exception of the sarcomas, do not metastasize.

The majority of cystadenomas are quite small, usually occur near or at the surface of the renal cortex, and are usually seen in older individuals. These tumors occur in cortical scars subsequent to sclerotic closure of terminal renal arteries. When remaining segments of tubules develop collateral blood supply they may progress to form cysts which may develop papillary intracystic processes. The lining epithelium is composed of dark cuboid cells, but occasional cells may have clear cytoplasm. These tumors are probably not malignant, but rarely may produce symptoms due to size. Solid adenomas are small yellow or white circumscribed tumors composed of solid cords of cells with cytoplasm varying from clear to dark. Mitoses are not common, but the tumor structurally resembles the adenocarcinoma, and probably represents the early stage of the more malignant lesion. Reports of metastases occurring from small lesions in the kidney seem to support this view.

Adenocarcinomas are spherical masses occurring in any location, usually in the cortex. The cut section varies from yellow to white with areas of hemorrhage, especially in the larger lesions, the so-called "variegated tumor" on cut section. These tumors may extend locally to involve all or a portion of the kidney parenchyma and the renal pedicle. Extension into the renal vein is common. Microscopically, the tumor may be composed of cells varying from clear to dark, and arranged as solid alveoli, papillary cysts or tubules. Highly undifferentiated dark cells with no definite arrangement may be found, and represent a more malignant lesion.

Wilms' tumors are large, rapidly-growing tumors which infiltrate quickly and metastasize widely. Microscopically, the tumor is composed of epithelial and connective tissue elements. One may find stages varying from solid mesenchymal tissue to completely differentiated tubules. In addition,

areas of striated muscle, smooth muscle and cartilage are found.

Tumors of the renal pelvis, papillomas, are cauliflower-like growths occurring in calyces or renal pelves and attached to the mucosa by narrow pedicles. Microscopically, they are composed of fronds of well-differentiated transitional epithelium with infrequent or no mitoses. Papillary carcinomas have broad bases, and microscopically show evidence of mitotic activity and varying numbers of undifferentiated cells. Squamous cell carcinoma is a sessile lesion which microscopically shows cords and masses of transitional cells with evidence of cornification and keratinization.

Symptoms

This paper is concerned chiefly with hypernephroma and when one thinks of hypernephroma, he immediately recalls the "classic triad" of hematuria, pain, and a mass. The incidence of intermittent grossly bloody urine in carcinoma of the renal parenchyma varies from approximately 15 to 85 per cent, with most figures between 60 to 65 per cent.⁷ Mechanisms by which the tumor produces hematuria are actual tumor invasion of the renal pelvis or calyces and/or congestion of pelvic vessels due to tumor pressure. Hematuria is a relatively early symptom, usually painless, appearing occasionally only once, and frequently noted in an observant apparently healthy individual. Other signs and symptoms may not appear for several months or years. Pain, the second component of the classic triad, frequently is the initial symptom, or may occur with bleeding, and occurs in from 40 to 80 per cent of cases. This pain is usually indefinite, dull in character, situated in the flanks or upper abdomen of the affected side, and due to tension on the capsule of the kidney by the increase in size, pressure on nearby structures, pull on the renal pedicle by the kidney, hemorrhage or displacement by the mass. Pain less often may be colicky in type when hematuria with clots occurs. Presence of a mass, the third characteristic, varies considerably and is usually a late and very poor prognostic sign. Other symptoms consist of anorexia, fatigability, weight loss, and low-grade fever. Creevy⁵ has emphasized the frequent presence of fever as an early symptom. Metastatic lesions may be the first indication that a renal neoplasm is present. Such tumors may metastasize early and widely as demonstrated by Bandler's¹ report of a patient with

a testicular tumor considered pathologically to be a rare primary tumor, and which antedated the presence of a diagnosed renal tumor by two years with negative pyelograms at the time of orchiectomy. Estimates of the frequency with which metastatic lesions are the first presenting symptoms range from 9 to 50 per cent in various series.

Conditions Responsible for Confusion

First among these is the tendency of such a neoplasm to grow slowly and silently for many years prior to symptoms. Several instances of the presence of a tumor for ten to twenty years have been recorded. Further evidence of the slow growth of malignant renal neoplasms has been found in a number of patients in whom the metastasis was found years after the original tumor has been removed. Secondly, usually no local symptoms are produced until the renal pelvis, its capsule or adjacent organs are invaded. This tendency to slow progressive invasion is important in view of the location of the kidney, since a malignant renal neoplasm may simulate a primary lesion of the bowel, stomach, biliary tract, pancreas or spleen. A third characteristic often confusing is the extensive manner in which the tumor may metastasize. This can occur by antegrade, or retrograde, spread by way of venous and/or lymphatic systems. Therefore, metastases from these neoplasms have been found in every organ of the body. Batson² demonstrated a logical and anatomic route by which such metastases can occur. In an attempt to explain some of the paradoxical metastases which occur, Batson injected radio-opaque media in the dorsal vein of the penis in cadavers and in monkeys. Based on the conclusions of these experiments, a new concept developed, that of a vast intercommunicating system of veins investing the vertebral column, the sacrum and the adjacent wings of the ilia. This system of veins is characterized by thin walls, low pressure, absence of valves, and communications with renal, portal and caval circulations. Any increase in intra-abdominal pressure such as occurs in coughing, straining or lifting, will reverse the flow of blood in this system, and dislodge tumor emboli, producing paradoxical metastases which bypass the pulmonary, portal and caval circulations. Long and Black have reported the case of a solitary thyroid metastatic implant from a hypernephroma and explain this by applying Batson's theory (from Bandler¹).

Hollingshead and McFarlane⁸ have produced conditions similar to those existing when tumor emboli occlude the renal vein. Wrapping the renal vein in dogs with cellophane tape produces a gradual fibrosis and resultant constriction of the lumen of the vein. Subsequent to this, dilated local venous channels appear in the perirenal fat as collateral circulation. The collateral circulation which develops conducts blood from the kidney through enlarged subcapsular veins and then to the capsular veins in the perirenal fat. The capsular veins communicate with the adrenal, ovarian or internal spermatic, lumbar and ureteric veins. Tumor emboli may travel along any of these dilated channels in a retrograde manner and produce metastases in any region drained by these vessels. This is the mechanism which undoubtedly accounts for the unusual metastasis demonstrated in the case report presented below.

Pyelographic Appearance

Pyelographic appearance of neoplasm⁴ may show:

1. Enlargement or irregularity, or both, of the renal outline.
2. Elongation of one or more calyces, with an abnormal termination.
3. Narrowing or complete obliteration of a calyx or group of calyces.
4. Encroachment on the pelvis to cause flattening, elongation, narrowing, irregular filling defects or complete obliteration.
5. Deformity or complete occlusion of the ureteropelvic junction.
6. Secondary pyelectasis.
7. Calcification.
8. Abnormal position of the renal pelvis.
9. Complete disruption of the gross architectural composition of the kidney.

Conditions Simulated by Renal Neoplasm

The problem of differential diagnosis can at times be extremely difficult, for any of the following lesions can produce changes simulating a renal neoplasm:

1. Extrarenal tumors (intra-abdominal)
2. Retroperitoneal tumors
3. Hydronephrosis
4. Tuberculosis of the kidney
5. Pancreatic cysts
6. Mesenteric cysts
7. Splenomegaly and splenic cysts
8. Hepatomegaly and liver cysts
9. Hydrops of the gall bladder

Lateral and oblique roentgenograms and views taken with the patient in Trendelenburg and in upright positions may be useful in arriving at the correct diagnosis. Aortography and presacral air



Fig. 1. Gross appearance of tumor nodule in left hemi-scrotum superior to left hydrocele.

injection are additional procedures sometimes helpful. At times, surgical exploration may be the only definite method of determining the true nature of the problem.

Case Report

A. P., aged seventy-six, was admitted to the hospital on March 3, 1955. Thirty years previously he had had surgical treatment for a left hydrocele, which recurred in October, 1954. He consulted his family physician concerning the hydrocele three months prior to admission, and was told he should have surgical removal of a left testicular tumor, but the advice was disregarded. Minimal nonprogressive vesical neck obstruction symptoms secondary to benign prostatic hyperplasia had been present for one year prior to admission. Intermittent gross total painless hematuria developed two to three weeks before admission. He had no known chills or fever. One episode of acute urinary retention just prior to admission was relieved by catheterization. The patient's main complaint was difficulty in walking or sitting with comfort because of the presence of a large scrotal mass.

Physical examination revealed an alert, emaciated elderly white man. Head and neck were normal. Full dentures were present. Auscultation of the chest revealed fine moist rales at both bases. The heart tones were of good quality with no irregularities or murmurs present. Inspection of the abdomen showed an enlarged venous tree in the suprapubic region. No definite masses or tenderness were noted, but an indefinite fullness suggested the possibility of free fluid. Bilateral inguinal herniae were present. Enlarged inguinal nodes

were palpable bilaterally. A large hydrocele 15 cm. in diameter was present in the left scrotum, with a hard tumor measuring 4 x 6 cm. above the hydrocele (Fig. 1). The left testicle could not be definitely found.

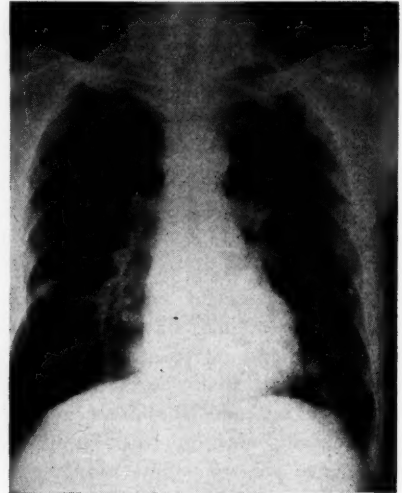


Fig. 2. Chest film demonstrating multiple metastatic tumor nodules in both lung fields.

The spermatic cord was anterior, enlarged to 3 centimeters in diameter and firm. No varicocele was found. The right testicle was normal. The prostate was 1 plus enlarged (on the basis of 1 to 4), smooth, movable, and of benign consistency.

Admission chest x-ray demonstrated multiple metastatic malignant nodules in both lung fields (Fig. 2).

Laboratory Findings.—The hemoglobin was 11.4 grams per cent; leukocytes 5,300, with neutrophils 64 per cent, lymphocytes 31 per cent, monocytes 3 per cent, and eosinophiles 2 per cent. Erythrocyte sedimentation rate was 99 mm. in one hour (Westergren). The blood urea nitrogen was 13.5 mg. per cent, and creatinine was 1.9 mg. per cent.

The urine had a pH of 5.0, specific gravity of 1.025, 2 + albumin, no sugar, an occasional WBC, and 4 + red blood cells.

Electrocardiogram was normal.

Intravenous excretory urographic series on March 5, 1955, showed a well-outlined, normally functioning right kidney, and failure of excretion of contrast media by the left kidney. No definite left renal outline was visible. Multiple calcifications were present in the region of the lower pole of the left kidney (Figs. 3 and 4).

Cystoscopy on March 7, 1955, revealed an S-shaped curve deformity in the proximal third of the pendulous urethra in the area adjacent to the bulbomembranous juncture. This was produced by the left hemiscrotum and its tumor process encroaching upon the urethra and surrounding structures. A grade 1 benign trilobar prostatic hyperplasia was present. There was no evi-

dence of intravesical tumor, calculus, diverticulum or foreign body. The bladder was filled with bloody urine and string-like clots. The right ureteral orifice was normal and clear urine appeared from it at regular

tumor was adherent to the internal surface of the scrotum but did not appear to involve the scrotal skin. Microscopic sections showed no residual normal testicular parenchyma. One of the sections revealed involvement



Fig. 3. KUB film prior to injection of contrast material. Normal right renal outline. Diffuse left renal outline with multiple calcifications present in region of lower pole of left kidney.



Fig. 4. Excretory urographic series five minute film demonstrating normal right upper urinary tract. No demonstrable function of contrast material in left renal area.

intervals. A large clot was seen to extrude from the left ureteral orifice with several smaller clots behind it, followed by gross hematuria. A No. 8 French Foley acorn catheter was impacted in the left ureteral orifice and an occlusion ureterogram was made which filled the ureter to the level of the sacroiliac synchondrosis. The ureter in this area appeared to be filled with clots. A No. 6 French catheter passed to the left renal pelvis without encountering obstruction and fresh bright red and old dark blood was obtained. Subsequent pyelographic studies revealed a filling defect in the inferior portion of the renal pelvis and an extrinsic pressure defect completely obliterating the inferior major calyceal and a portion of the middle major calyceal systems produced by a large indefinite mass in the lower pole of the left kidney (Fig. 5). This mass appeared to encroach upon the superior portion of the iliac crest and measured approximately 18 to 20 centimeters in diameter. The renal outline in the lower pole was ill-defined, irregular and distorted. On March 9, 1955, a left orchietomy with preliminary high ligation of the cord and repair of the inguinal hernia was done.

Gross Pathology Report.—Specimen consisted of an adherent mass measuring 18 x 9 x 9 cm. made up of the testis and hydrocele. The hydrocele was large, contained clear fluid, and was made up of two distinct locules. The testis itself measured 6.5 x 5.5 x 5 cm. and appeared almost completely replaced by hemorrhagic tumor with a large central area of necrosis. The



Fig. 5. Left retrograde uretero-pyelogram demonstrating tumor defect in renal pelvis and in lower pole of left kidney. Note blood clots in ureter producing filling defect at ureteropelvic juncture and also large defect in region of junction of middle and lower third of ureter. The patient had an acute gastric dilatation during the course of anesthesia and this was relieved by stomach tube seen in film.

of the epididymis by tumor. All three sections showed a similar pattern, and the tumor was characteristic of

classic hypernephroma. The epithelial cells had clear cytoplasm and in areas formed small glands and tubules. The nuclei varied only slightly in size (Figs. 6 and 7).

Course following surgery was satisfactory with the

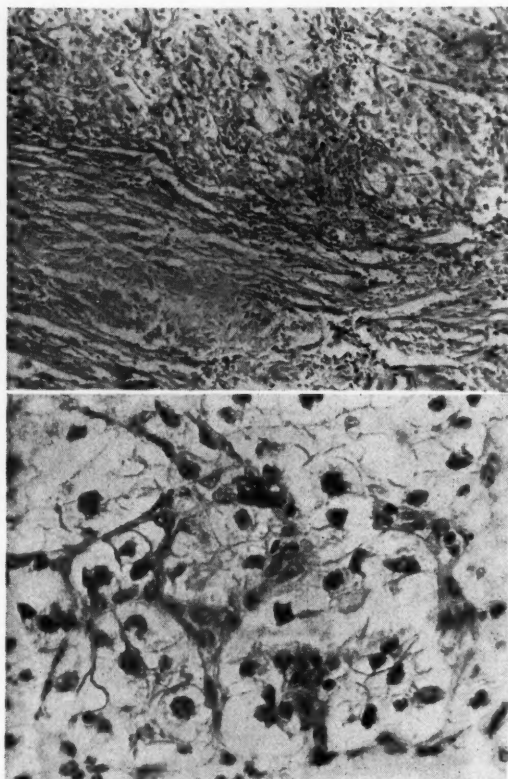


Fig. 6. (above) Lower power section of testicle showing metastatic hypernephroma.

Fig. 7. (below) High power section of tumor area involving left testicle.

exception of fever, which gradually diminished by the sixth postoperative day, and a minimal separation of the wound in the area adjacent to the penis. His voiding pattern was fair, with only an occasional involuntary urination. He was discharged on the nineteenth postoperative day, but was re-admitted the following day because relatives were unable to care for him. The patient's course after readmission was progressively downhill. Temperature varied from 99 to 103.8° F throughout the remaining days. The urine became purulent, and an indwelling urethral catheter was placed. Seropurulent drainage appeared spontaneously from the upper angle of the wound. Patient refused food or fluids, became lethargic and finally expired on April 21, 1955.

Autopsy Findings.—The body was that of an elderly white man 168 cm. in length, estimated to weigh 90 pounds, well-developed but emaciated. There were no significant special marks of note with the exception of

a recent surgical scar in the left inguinal region, at the upper end of which there was an open draining sinus. The peritoneal cavity was opened in the usual manner. The diaphragm arched to the sixth interspace bilaterally. The liver extended to the costal margin in the right midclavicular line and 4 cm. below the xiphoid in the midline. The pleural cavities showed bilateral fibrous adhesions but were otherwise within normal limits. The pericardial sac showed no gross abnormalities. The heart weighed 320 grams. The epicardial surfaces were smooth. The heart was opened in the usual manner. The endocardial surfaces, valve rings and leaflets were within normal limits. Section of the coronaries revealed mild diffuse sclerosis. The right lung weighed 600 grams and the left 540 grams. Diffusely distributed throughout all lobes of both lungs were subpleural and parenchymal tumor nodules, the largest measuring 3 x 2 cm. These tumor nodules appeared gray and presented irregular areas of necrosis. The intervening pulmonary parenchyma was within normal limits. The spleen weighed 600 grams and showed diffuse congestion. The congestion of the spleen may have been secondary to pressure from an enlarged tumor involving the left kidney. The liver weighed 1,810 grams and showed no gross abnormalities. The gall bladder contained no calculi. The bile ducts were patent. The esophagus, stomach, small bowel and colon showed no significant gross abnormalities. The pancreas and adrenals were grossly within normal limits. The right kidney weighed 250 grams and was grossly within normal limits. Sectioning of the right kidney revealed the presence of numerous cortical abscesses. There was moderate hydronephrosis and hydroureter on the right. The exact origin of this hydronephrosis was not evident from gross examination. No stricture or obstruction of the ureter was detected. The left kidney weighed 920 grams and was diffusely replaced by irregular nodules of partially necrotic tumor. Dissection of the renal vein on the left revealed grossly visible tumor thrombus extending into the main renal vein. Dissection of the renal pelvis revealed a large mass of tumor which extended into the renal pelvis. The ureter distal to the pelvis on the left was of normal caliber. The urinary bladder showed no gross abnormality. The left testicle had been removed. The right testicle was grossly normal. The prostate showed no gross significant abnormalities. The aorta was within normal limits. There was a nodule in the inferior portion of the right lobe of the thyroid 1 cm. in diameter. The lymphatics were within normal limits. The head was not examined.

Microscopic Findings.—Section of the left renal tumor revealed it to be a moderately pleomorphic clear-cell type cortical adenocarcinoma (hypernephroma) of the kidney (Figs. 8, 9, 10). Sections of the right kidney revealed extreme destruction of the cortex and medullary structures by suppurative inflammatory reaction. There was an intense suppurative inflammatory reaction involving the mucous membrane of the renal pelvis and ureter. Sections of the prostatic urethra and prostatic parenchyma likewise revealed evidence of necrosis and inflammatory destruction of the prostatic

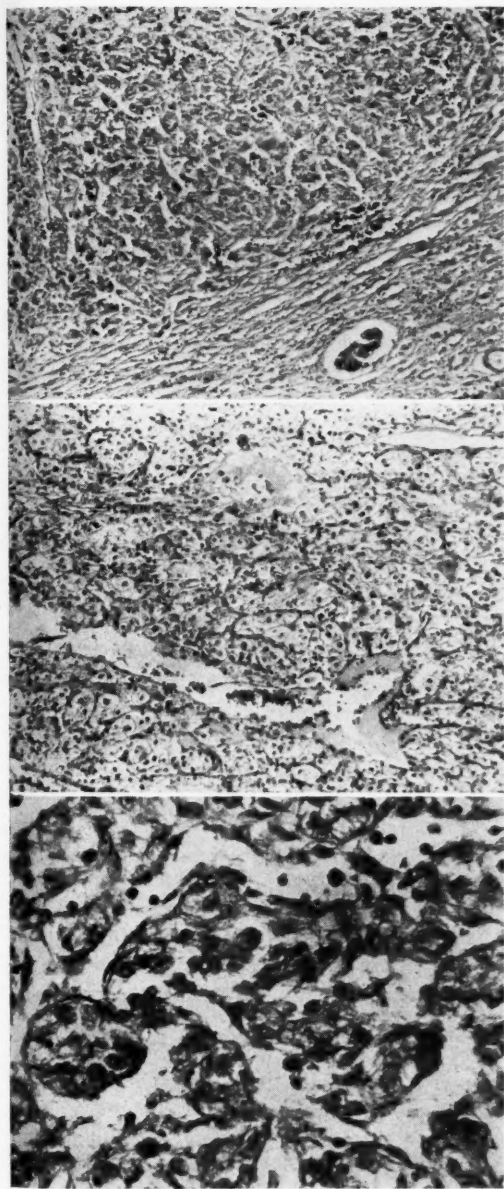


Fig. 8. (above) Low power section of left kidney showing tumor encroaching upon normal renal parenchyma. Note the deep staining granular type cytoplasm in this section. Fig. 9. (center) Lower power section of left kidney showing another section of tumor area with more commonly seen foamy type cytoplasm of tumor cells. Fig. 10 (below) High power section of tumor of left kidney showing tendency to more granular cytoplasm in the central tumor cells while those in the upper left hand corner have the more foamy type cytoplasm.

parenchyma. The spleen showed acute splenitis. Sections of the lungs showed terminal bronchopneumonia as well as the presence of tumor nodules histologically

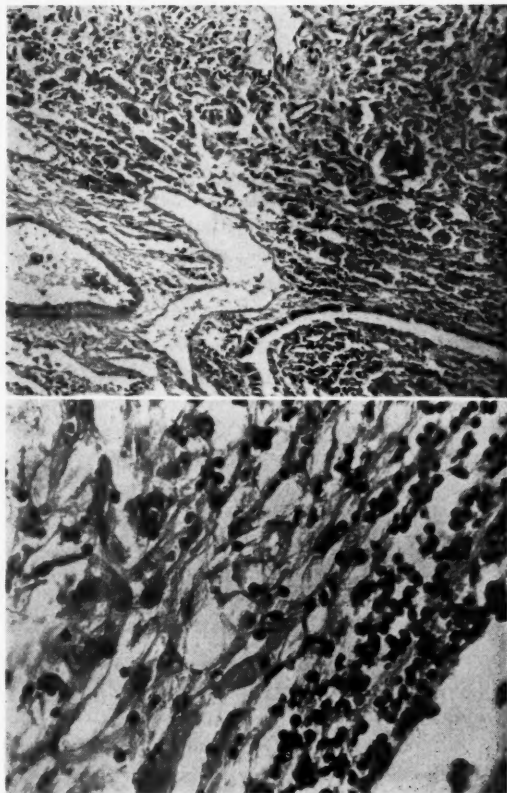


Fig. 11. (above) Low power section of tumor nodule of lower lobe of left lung with adjacent normal lung tissue. Fig. 12. (below) High power section of tumor nodule metastatic to left lung.

identical to those observed in the kidney tumor (Figs. 11 and 12). A metastatic tumor removed surgically involving the left testicle was likewise identical histologically with the tumor observed in the kidney (Figs. 6 and 7).

Comments

This case is unusual, for the testicle is rarely involved by metastatic carcinoma from the kidney. Creevy⁵ reports one case of a thirty-seven-year-old male suffering from backache in the region of the sacrum and low-grade intermittent fever for several months before a swelling of the left side of the scrotum and urinary retention simultaneously developed. Catheterization was followed by the development of a tender hard mass in the penoscrotal angle which was thought to be a peri-urethral abscess, but incision found the mass to be a solid tumor and microscopic examination showed a necrotic adenocarcinoma. The patient died twenty-four hours after ampu-

tation of the penis, and necropsy disclosed a hypernephroma of the left kidney with metastases to the lungs, liver, regional glands and left epididymis.

A second case by Bandler¹ is of particular interest because the first sign of hypernephroma was a testicular tumor which was considered pathologically to be a rare primary tumor and antedated the presence of the kidney tumor by two years. Bandler's case was that of a forty-seven-year-old male executive who presented a swelling and pain in the right testicle of two weeks' duration with the loss of ten to fifteen pounds of weight. X-ray and examination of the chest at that time was negative, and an excretory urographic series was normal. Clinical impression was orchitis of an undisclosed origin. Following several days devoted to better regulation of a diabetic state, the testicle failed to improve and the right scrotal site was surgically explored. The testicle was removed and a gross diagnosis of orchitis with abscess formation was made. Microscopic study, however, showed an unusual primary testicular tumor, presumably from the interstitial cells of the testis. Periodic examinations by his physician were carried out one and two years later, disclosing no recurrence of the tumor or evidence of metastatic lesions. However, two years and three months after the initial surgery, the patient was admitted with symptoms of gross hematuria and right flank pain. Urologic work-up demonstrated a pyelogram consistent with a tumor of the right kidney and this was removed. A diagnosis of hypernephroid carcinoma of the right kidney was made. The previously removed right testis was reconsidered as probably a metastasis of the present tumor rather than a primary interstitial cell tumor as previously reported. The metastatic testicular tumor antedated the renal tumor clinically by two years, for, at the time of orchiectomy, urography failed to demonstrate the presence of the kidney neoplasm. Metastatic implants clinically can antedate the presence of the primary tumor which is obviously very slow in its growth, but, even when the renal tumor is very small in size, metastasis can occur early and single metastasis can occur despite the continued growth of the tumor. Removal of the metastatic focus together with the primary site is worth while, for this case shows a clinical surgical cure three and one-half years after removal of the metastatic focus.

Willis¹⁰ reported four cases of metastatic tumor

in the testicle from primary kidney tumors. One patient had an adenocarcinoma of the left kidney with metastatic lesions in the left spermatic cord and testis, and also in the erectile tissues of the penis. Another had carcinoma of the left kidney with secondary involvement of the epididymis and spermatic cord. A third case of a left renal carcinoma with extension to the testis along the spermatic vein was cited. The fourth patient, a child, had a nephrectomy for Wilms' tumor with subsequent appearance of a scrotal tumor, and, upon removal of the testis and cord, a similar tumor was found lying partly within the spermatic vein.

Discussion

There is no doubt that a fairly high percentage of the cases of renal neoplasms will continue to escape recognition until late in their course. Not merely because patients are prone to delay medical consultation and because the disease often produces syndromes difficult to identify, but chiefly by the fact that the first symptoms to attract the patient's attention are so often not due to the tumor itself, but to a metastasis or a local extension. This is the situation which cannot at present be fully met in any practicable manner. To be sure, a painstaking elicitation of the history would perhaps have revealed facts which would have brought up the question of renal neoplasm, particularly if an episode of hematuria which had been forgotten by the patient or a brief attack of renal colic occurred. A more careful physical examination in obscure cases might be helpful, but is of uncertain value since many normal kidneys are palpable and since many large tumors escape detection. The key to the whole problem lies in considering the possibility of a malignant renal tumor in every case of an obscure ailment, particularly so in cases of the osseous, pulmonary, gastrointestinal or nervous tract, or those of obscure fever or anemia. In these cases, investigation with excretory urography may be the most valuable diagnostic aid. Several instances of solitary metastases diagnosed microscopically as primary tumors have been followed by removal of a hypernephroma with survival of the patient.

Summary

A discussion of some of the problems encountered in diagnosis and treatment of renal neo-

(Continued on Page 741)

Rupture of Muscles and Tendons

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RUPTURES and tears of muscles and tendons are not so rare as the paucity of literature regarding them might indicate. Many patients with incomplete ruptures of this nature apparently are being treated conservatively with little improvement in symptoms because the pathologic changes underlying the injury escape detection. Total rupture of the belly of a muscle may be followed by the rapid development of a hematoma so that the defect between the fragments cannot be palpated; consequently, with little loss of function, the injury may pass unrecognized.

Ruptures of muscles and tendons without concomitant violence have been accepted on the basis of clinical and surgical experience as evidence of underlying pathologic changes involving the myotendon unit.¹ Experimental evidence exists to support this concept. The work of McMaster² on rabbits showed that a normal tendon does not rupture when subjected to severe strain. Instead, the insertion of the tendon may pull away with a fragment of bone, the belly of the muscle may rupture, the junction between tendon and muscle may separate, the origin of the muscle may pull away with a fragment of bone or the bones may fracture. These experiments also showed that a severe strain would be required to rupture the tendon when 50 per cent of a tendon's fibers were severed; even after severance of approximately 75 per cent of a tendon's fibers, normal activity did not result in rupture.

Etiology

Gilcreest³ has summarized the factors leading to disruption of the myotendon unit. Senility is considered by many investigators to be a prime factor. Aging results in diminution of muscular resiliency and elasticity and in some instances in decreased vascularity. Whether minute or complete, tears of the shoulder cuff are recognized as

being superimposed on a degenerative lesion, usually in patients beyond middle age. The tendon of the supraspinatus muscle thus affected rubs as it passes between the head of the humerus and the acromion or the coraco-acromial ligament and will rupture. In young people, muscles are ruptured more often than are tendons, whereas the converse is true in elderly people.

Arthritis may result in rupture of tendons by production of bony ridges in degenerative arthritis or because of rheumatoid tenosynovitis and attrition. In the latter instance, chronic inflammation in the tendon sheath may lead to adhesions, flattening and thinning, with such insidious progress that the patient may not realize when the actual rupture has taken place. Rheumatoid nodules actually may be present in the tendon and be the primary lesion.⁴ Myositis, acute infectious diseases, syphilis, tuberculosis and tumor also may involve muscles and cause rupture. Excessive fatigue is often considered a factor that perhaps renders the muscle fibers less likely to resist a sudden forceful pull. Certain occupations that focus a source of external stimuli often are related to the site of rupture, as in kettledrummer's palsy and rider's tendon.⁵

Direct trauma may result in rupture of a tendon either immediately or as a delayed result after repeated minor trauma. This also includes such factors as so-called spontaneous rupture of the extensor or flexor tendons of the hand after traumatic or rheumatoid arthritis of the distal radio-ulnar joint, Colles' fracture and Kienböck's disease. These entities are not predicated on the intrinsic strength of the involved tendon. Numerous ruptures of tendons occur after indirect trauma, during which forces are transmitted along the entire myotendon unit. Such an injury frequently reflects strength and integrity of the components of the myotendon. An example of such indirect trauma would be a mallet finger or, in some instances, rupture of the components of the quadriceps mechanism.

Of great interest are the idiopathic ruptures of

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RUPTURE OF MUSCLES AND TENDONS—WEINER AND LIPSCOM

TABLE I. MUSCLES AND TENDONS LISTED IN THE ORDER OF DECREASING FREQUENCY OF RUPTURE

Intrinsic extensors of fingers (mallet finger and boutonnière deformity)
Shoulder cuff (tears)
Components of quadriceps mechanism
Triceps surae and plantaris
Extensor pollicis longus and extensor digitorum communis
Extensors of toes
Biceps brachii
Pectoralis major, pectoralis minor, trapezius, sacrospinalis, rectus abdominis, deltoid, adductors of the thigh and anterior serratus

muscles or tendons, such as rupture of the heel cord, that occur in young people in the apparent absence of any underlying pathologic changes. There are extremely few reports of ruptures occurring with the myotendon unit in a relaxed state. In most instances, ruptures occur with one unit in strong contraction when a group of antagonists is suddenly brought into play. Frequently, a surprise or unexpected movement occurs.

In rupture of a contracted muscle, an audible snap, like the crack of a whip, is often heard. In spontaneous rupture, the startled patient often will look at the site of injury to see what has hit him.

Site and Frequency of Rupture

It is difficult to ascertain the order of frequency with which various tendons and muscles rupture not only because of the great variance in published series but because many investigators consider that clinical figures do not reflect the true incidence. For instance, some necropsy studies show rupture of the supraspinatus muscle in 20 to 30 per cent of persons past the age of sixty years,⁶ whereas clinically the lesion is not seen or at least not recognized that frequently.

The accompanying table lists muscles and tendons in the order of frequency with which they become ruptured.

Response of Tendon to Injury

The behavior of tendons in response to injury depends on their environment. Two types of surrounding membrane may be present, namely synovial sheath or paratenon.

The synovial sheath ordinarily permits the tendon to go around a corner and to pull efficiently. It consists of a visceral layer enveloping the tendon and a parietal layer lining the fascial tunnel, through which the tendon glides. These layers are

continuous via the mesotenon. Synovial sheaths are found in the hands, feet, long head of the biceps and the popliteus tendon. According to Fowler and associates,⁷ all other tendons are surrounded by paratenon. The paratenon has an outer layer of fibrous connective tissue and an inner filler of loose areolar connective tissue. The tendon itself has a vascular, physiologically active periphery but an avascular inert core. Bulbous enlargements may develop in tendons in response to stress, as in snapping the fingers.

Synovial sheaths have the same physiologic characteristics as do joints and apparently can suppress fibroplasia. A tendon severed in its sheath ordinarily retracts and lies inertly in its bed. The appearance a few days after injury is much the same as it will be years later. On the other hand, barring infection or repeated severe trauma, which in itself may stimulate fibroplasia, a severed tendon surrounded by paratenon undergoes a remarkable degree of fibroplasia, with proliferating fibroblasts from the periphery apparently growing to effect repair. If the lesion is incised cleanly, with minimal disorder in the surrounding tissue, functional repair may take place, particularly if proper splinting is employed.

The surface layers of the tendon are also important, and their treatment may determine the success or failure of tenorrhaphy. Even with union, tenorrhaphy is not a success if the tendon will not glide. We also consider that mechanical irritation is important and that a suture in the periphery of a tendon enclosed in a synovial sheath is likely to result in a fibroblastic response in the active layer of the tendon. Hence, we recommend use of a pull-out suture rather than direct suture, particularly for repair of tendons that must glide in a synovial sheath. When an attempt is made to repair a tendon within a synovial sheath, subsequent swelling and edema at the site of anastomosis may constrict the tendon in its sheath, making it too tight to move in the fibroosseus canal. This may result in circulatory embarrassment and necrosis in the periphery of the tendon. Consequently, partial excision of the tendon sheath is necessary in these cases.

General Aspects of Treatment

Ruptures of tendons generally create difficult problems. The rupture usually takes place through unhealthy degenerated tissues. These tissues become extensively shredded and lacerated

in the process of rupturing, so that clean-cut viable ends suitable for primary repair, such as in an incised wound, are not present. When delayed repair is done weeks or months after the original injury, extensive scarring of the local region, as well as fixed contraction of the proximal musculature together with a large defect in continuity, makes treatment doubly difficult.

The best functional result following repair of tendons requires accurate and snug apposition of healthy tissue, without tension and with a minimum of foreign material at the healing site. Braided wire, silk sutures, fascia and tendon are common materials for maintaining apposition. Recently, the pull-out suture as described by Bunnell⁸ and modified for use with larger tendons by McLaughlin⁹ has had wide acceptance. In addition to direct anastomosis of tendons, other methods of treatment occasionally are indicated, including tendon grafts and transfer or transplantation of tendons. Tendons with short excursions that are surrounded by paratenon often are treated best by splinting the tendon in an optimal position. Some ruptures of tendons and muscles require no active treatment. It always should be kept in mind that a good functional result may be obtained after appropriate splinting whenever tenorrhaphy is not advisable for a tendon surrounded by paratenon. Even complete rupture of the tendo achillis treated conservatively may yield good functional results if splinted properly.

Management of Injuries to Specific Tendons

Severance of some tendons does not warrant surgical repair under any circumstances, either because these tendons have no essential function or because nature will repair the defect. The palmaris longus, the plantaris and the extensors of the toes fall into this group in which repair may be omitted. Tendons of secondary importance injured in complex wounds also should not be repaired lest a functionless mass of scar tissue result.⁷ An example would be a complex laceration of the flexor surface of the wrist; after repair of the nerves, the flexor pollicis longus and the flexor digitorum profundus are the only tendons to be repaired primarily. In lacerations of the dorsum of the wrist, the primary tendons to be repaired would be the abductor pollicis longus, the extensor carpi radialis brevis, the extensor pollicis longus and, if feasible, the common extensor tendons. The basic requirements for satisfac-

tory function are met by such selection, while the possibility of adhesion and scarring is diminished by avoiding repair of tendons of secondary importance.

Ruptures at Hand and Wrist.—Rupture at the insertion of the extensor tendons of the fingers into the base of the distal phalanges, the most frequent type of tendon rupture,¹⁰ usually occurs after forceful passive flexion of the distal phalanx while the finger is being extended actively, as in "baseball finger" or "mallet finger." This also may occur in women as they tuck in sheets while making a bed. The tendon occasionally may pull away a small fragment of bone and periosteum from the distal phalanx. The treatment of this injury has been discussed widely. Most physicians agree that prompt splinting in hyperextension by means of either plaster or a Kirschner wire placed through the distal interphalangeal joint will result in union after four to six weeks. If four weeks have elapsed after injury, however, conservative treatment is generally unsuccessful and surgical correction is necessary, either by use of a tendon graft or by shortening the tendon, which may have healed in a lengthened state. Many techniques have been described for this surgical repair, with variable results.^{8,11,12}

Buttonhole rupture of the extensor tendon of the finger over the proximal interphalangeal joint at the insertion to the second phalanx occurs frequently from trauma. The central dorsal aponeurotic slip ruptures and the two lateral slips loosen and become displaced in a volar fashion. This displacement is increased by the intrinsic muscle pull. These ruptures also may occur in patients who have rheumatoid arthritis. Such displacements require surgical repair.

Rupture of the extensor pollicis longus always is preceded by disease or injury. According to early German literature, such ruptures often occurred after synovitis in kettledrummers. It is seen more frequently now as a late sequela to Colles' fracture, occurring weeks or months after fracture. This may result from local necrosis either from rubbing over the site of the old fracture or from the tendon being caught in the callus subsequent to the original hematoma. Rheumatoid arthritis and tenosynovitis also may result in rupture of the extensor pollicis longus. Repair of this tendon is not possible by end-to-end suture because of the defect in continuity left with excision of the frayed and shredded ends of the

tendon. Although repair may be accomplished by means of a tendon graft, transfer of a tendon is more satisfactory. Use of the tendon of the extensor indicis proprius is most satisfactory, since its range of excursion is similar to that of the

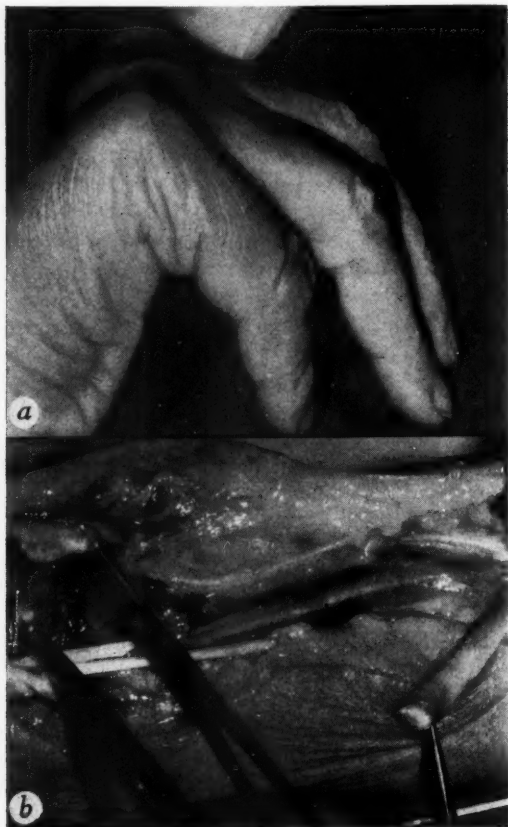


Fig. 1. Ruptured extensor tendons of the fingers in a sixty-two-year-old woman who had rheumatoid arthritis. She had ruptured the extensor tendon to the fifth finger five months previously while lifting a teaspoon. Five weeks later, she noted inability to extend her ring finger. Shortly after, she observed inability to extend the long finger.

(a.) This picture shows maximal extension of the three involved fingers compared to extension of the index finger shown at the extreme top. (b.) At operation, the proximal muscle bellies of the extensors to the long, ring and little fingers had retracted to the junction of the proximal and middle thirds of the forearm, leaving moderate defects in continuity, as pictured. Repair was accomplished by detaching the tendon of the extensor carpi radialis longus from its origin and suturing it to the distal fragments of the ruptured tendons.

ruptured tendon. However, the extensor carpi radialis brevis also may be used.

Rupture of the extensor tendons of the fingers at the wrist other than from direct trauma probably occurs next most frequently in patients who

have rheumatoid arthritis.⁴ Extensive mobility of the distal radio-ulnar joint occurs following erosion of the dorsal carpal ligament. This is equally true in degenerative arthritis at the distal radio-ulnar joint, according to Vaughn-Jackson.¹³ With continued pronation and supination, the ulna continually rubs and fragments the extensor tendons. Treatment of such injuries consists of use of a tendon graft or tendon transplant to the disrupted tendons (see Fig. 1). However, such repair often would be incomplete without resection of the distal portion of the ulna.

Lesions of Shoulder and Upper Arm.—Ruptures of the deltoid, serratus anterior, pectoralis major, coracobrachialis and triceps are rare. Tears of the rotator cuff are worthy of a treatise in themselves and will not be enlarged on.

Lesions of the biceps, well described in an excellent study by Gilcreest,¹⁴ do merit further comment. Clinically, they may be divided among ruptures of the long head (50 per cent), short head, belly of the muscle and the tendinous insertion at the radial tuberosity. Local degenerative changes from wear and tear and also trauma are the main etiologic factors.

Acute ruptures of the biceps muscle are striking. The pain may not be extremely severe but hemorrhage usually occurs rapidly and the blood spreads down the arm beneath the deep tissues. Atrophy of the belly of the muscle, with weakness and visible deficiency, is noted later. Acute rupture of either muscle or tendon merits early repair. Rupture of the long head is usually more or less transverse, either in the joint or above the inter-tubercular groove. The method of repair depends on the extent of the pathologic changes in the tendon and the location of the rupture. End-to-end anastomoses are generally not practical unless the rupture occurs at or near the junction of the muscle and tendon. The short proximal fragment generally is excised and the proximal portion of the distal fragment may be secured to the bicipital groove or to the coracoid process.

Avulsion of the distal biceps tendon may be treated by suture to the anterior surface of the radius or to the brachialis near its ulnar attachment. However, if a deficit in length need not be made up, the tendon may be reattached to the biceps tuberosity by means of a pull-out wire.

Rupture of Extensors of Knee.—Five lesions may be commonly encountered, namely (1) a

tear in the quadriceps proper, (2) a tear in the tendinous sheath above the patella (most likely to occur in elderly patients with senile changes in the tendon), (3) a tear of the patellar ligament, (4) a fracture through the patella, and (5) a tear at the tibial tuberosity (in younger growing patients).

Rupture of the extensors of the knee generally results from one of two mechanisms. A person starts to fall and holds himself straight with difficulty; in that instant, he feels a violent crack in his leg and he falls. The second mechanism involves a fall on a strongly flexed knee, with the resultant counterleverage producing a tear of the muscle or tendon or a fracture of the patella. It is considered that the patella is the most vulnerable structure when the myotendon unit is normal. Immediate hemorrhage follows the injury and the patella is found to be abnormally movable. Extension of the leg is impossible when the rupture is complete, although limited extension is possible with partial rupture. Treatment of a complete rupture is surgical. This may be done early if one can palpate the ends of the torn muscle but the hematoma forms so rapidly that frequently one may not recognize the true nature of the injury for several days. Multiple incomplete ruptures of the patella tendon rarely may result in a functionally deficient quadriceps mechanism without palpable defect.¹⁵

Ruptures of Soleus and Gastrocnemius Muscles

Ruptures of the soleus and gastrocnemius muscles do not always require surgical treatment. Gilcreest, in a personal communication to us, stated that Dr. C. H. Mayo some years ago discussed one of Gilcreest's papers on ruptured tendons and muscles. During this discussion, Dr. Mayo related his personal experience with a rupture of the soleus muscle as follows:

I had on a pair of low shoes with low heels and was running upstairs two steps at a time. My momentum was good and I slipped and fell forward, rupturing the soleus on the inner side. I wish to say that usually when the rupture of the muscle occurs the man who gets it knows it. There was no function and I could feel right away the depression of divided muscle. Within a few moments the depression filled with blood, so that it was rounded. I got home on one leg and the next day got to thinking about it. I had been in France a short time before, and in talking with a friend had commented on the fact that the girls over there used to have big calves, but now that they were wearing short shoes and high heels the calf had disappeared. I sent

down and got a big cork and put it in my shoe heel, and I was immediately able to get around. In three months after keeping to this relaxation, healing had taken place without operation.

Rupture of the Achilles Tendon.—The mechanism is a sudden strain on the tendon, as in forceful dorsiflexion of the foot. The victim may be suddenly shifting his weight by jumping backward on his toes with his knees bent so that the tendon stretches or he may slip, begin to fall and try to keep his balance by bending the knees and raising the heels. Age and obesity appear to be important factors, although ruptures may occur in young and apparently healthy persons.

The pathologic conditions that may weaken the tendo achillis include pyogenic infection, gonorrhea, tuberculosis, syphilis and gout. Ossification, which is seen so frequently about ruptures of the tendo achillis, may be a factor prior to rupture, although ossification may develop after injury and need not be an antecedent manifestation. According to Bate,¹⁶ the point of least resistance in the tendo achillis is located 2 to 4 cm. above its insertion in the os calcis. The patient who has an incomplete rupture can walk, although he has great pain. With complete rupture, he cannot walk normally, although he does not have much discomfort. Some workers have considered that it is next to impossible to make a clinical diagnosis of incomplete rupture.¹⁷

The treatment of incomplete tears may be conservative, the ankle being held in plantar flexion. However, a pressure dressing that is too tight about the wound can cause adhesions of the tendon to the posterior capsule of the ankle joint, with subsequent disability. Complete ruptures are treated surgically whenever possible.

Summary and Conclusions

Ruptures of muscles and tendons are not so rare as the lack of literature concerning them might suggest.

Normal tendons do not rupture when subjected to severe strain. Rupture may occur at the bony origin or insertion of the tendon, at the musculotendinous junction, or through the belly of the muscle. Pathologic processes may undermine the integrity of the myotendon unit so that minor strain may result in so-called spontaneous rupture.

Response of a tendon to injury depends to a great extent on whether its enveloping tissue is a synovial sheath or paratenon.

Repair by direct anastomosis is often not possible in "spontaneous" rupture of tendons, and other methods of treatment, such as tendon graft, transfer of tendons and transplantation of tendons, sometimes are utilized. Rupture of certain tendons seldom, if ever, requires surgical repair.

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PROBLEM OF SYPHILIS TODAY

(Continued from Page 722)

On examination there was an extensive nontender granulomatous process of the right side of the hard and soft palate that extended into the right tonsillar fossa. A central ulceration was present. The tongue was somewhat enlarged, smooth, purplish-silver in color and somewhat indurated. Firm, movable, nontender nodes, 2 cm. in diameter, were present in each submaxillary area.

It was our impression that the oral lesion was a gumma. The histopathologic pattern of tissue removed for biopsy was compatible with this diagnosis, with no evidence of a malignant lesion being present. The patient's serologic tests for syphilis were positive, but the cerebrospinal fluid examination was reported as negative.

The patient was given 10,600,000 units of penicillin intramuscularly in divided doses for ten days. At the end of the period, there was marked healing of the granuloma of the mouth.

Summary

1. The records of 1,559 patients with positive serologic tests for syphilis are reviewed, and the cause of the reaction is determined insofar as this is possible. These results are summarized in tabular form.
2. Short case reports on five patients are presented as illustrative of the clinical problem of syphilis seen today.

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Importance of the Diagnosis of Glaucoma

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ONCE the diagnosis of glaucoma has been established the patient is committed to a lifetime of observation and treatment. There is no such thing as a cure for glaucoma, and the best that can be had at present is adequate control of the disease. Since the course of the disease is usually progressive and because the treatment may be surgical if daily use of miotic drops does not lower the elevated intraocular pressure, and because of the fears that are engendered in the minds of many patients by mention of glaucoma, it is important that accuracy be of the highest order in making the diagnosis and caring for the follow up of these patients. Unfortunately, it is not always a simple matter to determine whether or not early glaucoma is present. The beginning stages of the disease are unaccompanied by any signs or symptoms that would enable the patient to know of its presence, and often considerable damage has occurred to the retina and optic nerve before an increase in ocular pressure is recognized during the routine ocular examination. Even the recognition of an elevated pressure is not in itself positive evidence of the presence of glaucoma, for occasionally the stress of the examination or the manipulation incident to taking the intraocular pressure will cause the patient to have a transient increase in pressure. It is obligatory, therefore, to have repeated pressure tests and to look for other evidence of changes in the eye before a positive diagnosis is made.

The relationship of glaucoma to certain symptoms should be clarified. In the usual chronic type of glaucoma there are no symptoms. The visual acuity is not affected, and if there are any changes in the visual fields, the patient is unaware of it. Pain is not present, and if there is so much as slight headache it is often passed off as being due to other things. In acute glau-

coma a different circumstance exists, for in this there is a rather rapid rise in intra-ocular pressure to a very high level. With the increase in pressure there is redness of the eye, and the appearance of a halo around lights. This is accompanied by blurring and loss of vision, and increasingly amount of pain in the eye and head. This pain is so severe that it completely incapacitates the patient and causes vomiting. It persists until the pressure in the eye is relieved. Acute glaucoma is an ocular emergency that calls for immediate medical or surgical care in order to lower the intra-ocular pressure to normal. It is not difficult to diagnose and it is adequately and usually permanently cared for by surgical intervention for a peripheral iridectomy controls the pressure in most instances by preventing blockage of the narrow angle of the anterior chamber by the root of the iris.

In chronic glaucoma it is necessary to utilize special examinations to ascertain the amount of damage that has occurred because of the disease. Most ophthalmologists feel that the increased pressure is the earliest manifestation of the disease, and that the pressure causes deterioration of vision. The cause for the increased pressure is not obvious, but usually it is thought of in terms of formation of aqueous and outflow of it. Of these it seems that obstruction to the outflow is the more important in the incipient stage of the disease. Since the aqueous flows from the anterior chamber through the mesh work of the chamber angle into the canal of Schlemm and then into collecting venules to finally empty into the veins of the conjunctiva, it is possible for a blockage to occur at any of these places with resulting increased pressure. The effect of blockage of the posterior drainage through the vortex veins cannot readily be evaluated, but must be considered in the early stages of glaucoma. The formation of aqueous in the ciliary body can play a part in governing the intraocular pressure since a high rate of formation could overtax the drain-

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age and cause elevation in pressure. The outflow facility is measured by maintaining a pressure on the globe for a five-minute period of time and observing the change in pressure that occurs. In glaucoma the facility of outflow is impaired. If the outflow rate is approximately normal but the intraocular pressure is high, it is then assumed that the rate of formation of aqueous is increased. This test can be very helpful in evaluating the presence of glaucoma.

There is a slight variation in intra-ocular pressure during the twenty-four-hour-period. Usually the differences are only a matter of two or four millimeters of mercury, and the highest reading is within the normal range. In many patients with early glaucoma a definite rise in pressure can be recorded early in the morning at the waking time. This peak often reaches pathologic levels and when found is of great value in aiding diagnosis. Therefore, in many patients with suspected glaucoma readings of the intraocular pressure are made throughout the day and night in order to obtain the diurnal curve of pressure.

Under some special test circumstances the intra-ocular pressure will rise if early glaucoma is present. These tests are called provocative because they provoke a glaucomatous state in the susceptible eye. Dilating the pupil, drinking coffee, or even a quart of water may cause a rise of pressure of 5 to 10 mm. of mercury in a glaucomatous eye, while in the normal there may be no change. Great care is necessary in order to correctly interpret the results of these tests, for a negative one is not proof of the absence of glaucoma, and a positive one may not mean chronic glaucoma but rather a susceptibility to an attack of acute glaucoma.

The visual fields are of exceedingly great value in learning of the presence or absence of glaucoma. Usually it can be stated that evidence of glaucoma as a destructive disease does not exist until loss of vision has been demonstrated. Loss of vision is first recognized in the visual fields. It is possible that glaucoma can be present in a very early stage without there being any evidence of it, but most often when it is that early accurate diagnosis is not possible and only the supposition of its presence can be made. In the diagnosis and follow up of this disease the value of accurate methods for evaluating the visual fields is demonstrated.

Accuracy in diagnostic technique requires the

use of the tangent screen in order to pick up the early changes that occur in the nasal periphery and about the blind spot. This is accomplished best when the 1 mm. target is used at a distance of 1 meter. The use of smaller targets is not generally advocated because transient physiologic scotomata in the region of the blind spot can be misleading. The 1 mm. target at 2 meters is required to demonstrate baring of the blind spot as the early indication of glaucoma. If larger targets are used the peripheral isopter is more than twelve degrees peripheral to the blind-spot and baring of it is unlikely until late in the disease. The use of targets larger than 1 mm. at one meter is to be condemned for such stimuli are too gross to allow effective accuracy in the early diagnosis for a very considerable loss of peripheral field can occur before it is discoverable on the tangent screen with the 2/1000 mm. target.

Through the injudicious and inaccurate use of the visual fields serious errors can be made. If one is to rely on the state of the visual field in the diagnosis and care of the glaucoma patient, it is necessary that the fields be the most accurate obtainable. Furthermore, the limitations must be understood and repeated tests may be necessary over a period of time in order to establish the normalcy of the eyes. As indicated above the use of large targets prevents the demonstration of pathologic changes in the fields. Errors are also made in placing too much trust in a single visual field determination that shows concentric, nasal or temporal contraction, with or without enlargement of the blind spot. These appearances can be the result of many things other than glaucoma, the most frequent being fatigue. Apparent changes in the region of the blind spot may occur if small targets are used (1/2000 mm.), for transient angioscotomata are demonstrated with this technique. Most frequently errors occur in the interpretation of fields obtained at follow-up examinations. Under these circumstances there can be apparent changes that are transient in nature and due to general or local conditions not directly associated with the glaucomatous process. Emotional strain, fatigue, illness, exposure to bright light can cause apparent deterioration of the fields—a fact that can be readily demonstrated by repeating the test at a more favorable time. Opacities in the lens due to nuclear sclerosis and senile cataract may cause change in the visual fields that

can simulate those of glaucoma. Narrowing of the visual fields will occur in many glaucomatous patients after constriction of the pupils. A standard pupil size should be maintained in taking visual fields in order to avoid false changes that would appear to indicate lack of adequate control.

Although changes in the nerve head are ultimate consequences of glaucoma, the recognition of glaucomatous cupping of the disc is not of significance in the diagnosis of early glaucoma. Therefore, the presence or absence of the disease must be established through study of the intraocular pressure and the visual fields.

Once the disease is diagnosed, it is necessary for the patient to begin a regime that will continue for the remainder of his life. This regime requires that he use the prescribed medication at regular intervals every day without fail. He must make regular visits to the oculist in order to have measurements of his ocular pressure and visual fields. He lives always in a consciousness of the progressive nature of his ocular disease, and with the knowledge that neglect of his treatment and observation will mean accelerated loss of vision. This must be explained to the patient so that he understands the nature of the disease, the necessity for treatment and the importance of repeated observation. Yet this knowledge should be given without inducing unnecessary fear. If the patient can be adequately apprised of his condition and if he can be made to carry out his treatment, there is no reason for threatening him with blindness.

There is diversity in practice concerning the patient who is suspected of glaucoma but in whom positive diagnosis cannot be made. It does not seem justified to subject these persons generally to the mental concern that results from a positive diagnosis and in many cases no treatment may

be required. Observation of such patients over a long period of time demonstrates that an elevation of intraocular pressure is carried by some persons over a period of years without changes in the visual fields. Such patients diagnosed and treated as glaucoma, of course, do very well for their response is ideal—no changes in the vision or visual fields occur. These people may not have glaucoma, yet one wonders if many of them are not included when mass studies are made of the intraocular pressure of the general population. All of us see patients who are using miotics who have been diagnosed as having glaucoma but in whom the evidence of the disease is still lacking several years after the cessation of the use of a miotic. It can likewise be stated that a certain number of these patients with suspiciously elevated pressure have early glaucoma. One has to decide whether to await evidence of the disease in the visual fields or whether to err on the side of positive diagnosis in the interest of saving vision. Some practitioners advise miotics for all patients who have an increased intraocular pressure because they thereby avoid the possible deterioration that would occur in a glaucomatous patient without treatment. However, it is then also reasoned that because the pressure is not lowered by miotics, surgical intervention is necessary. It appears reasonable that visual field changes should be demonstrated before surgery is advised, except in the presence of the narrow angle type of glaucoma that is relieved by peripheral iridectomy. Where possible I prefer to observe the patients over a period of time in order to demonstrate the presence or absence of changes in the visual fields. Under careful supervision such patients can still be diagnosed long before any serious damage has occurred to the eye.

ASSURE TWO GOOD EYES

Children's vision should be checked early, preferably before the age of four, according to Dr. Henry F. Allen, Boston ophthalmologist. The "critical time" in developing acute vision is between the ages of one and seven, for the learning ability of any eye sharply falls off after that, he stated.

Children whose eyes obviously turn inward or outward usually receive treatment early. But many others, whose difficulties are in only one eye, frequently do not receive

treatment until too late. There is always the chance that the child will lose the good eye through disease or injury, Dr. Allen warned.

In many cases the prescription of glasses at an early age is enough to insure normal development of both eyes instead of only one. In other cases the poor eye can be "taught" to function by covering the good eye with a patch and forcing the bad eye to work.—ALLEN, H. F.: *Today's Health*, 34:22 (Sept.) 1956.

Case Presentation

Chlorpromazine Therapy Complicated By Agranulocytosis and Jaundice

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CHLORPROMAZINE [10-(γ -dimethylamino-n-propyl)-2-chlorophenothiazine hydrochloride] was introduced into this country approximately three years ago and since that time has enjoyed extensive use in the symptomatic treatment of some disorders of the nervous system. There have been few unfavorable reports associated with its usage. However, there have been some contraindications to its use reported in regard to toxicity and even fatality.¹⁻⁴

This case report is submitted because it illustrates more than one serious complication occurring with the use of this drug and, therefore, Chlorpromazine may be considered potentially dangerous. Due to its indiscriminate use by physicians, other than neuropsychiatrists, we feel it important to recognize more than one toxicity when it endangers life. Jaundice and agranulocytosis have been reported separately; however, neither have been reported concomitantly in the same patient without fatality. In this patient both complications disappeared without sequelae twenty-five days after cessation of Chlorpromazine therapy.

Report of Case

R. P., a forty-year-old white salesman was first examined in June, 1948, following a back injury. At this time he presented a syndrome of rootlet irritation and was treated conservatively with bed rest and analgesics. A tentative diagnosis of herniated nucleus pulposus was suggested. He made an uneventful recovery from the acute episode and continued to take analgesics containing codeine for relief of back ailments and nervous tension. In 1950, he experienced a recurrence of low back pain, and a myelogram (pantopaque) revealed a defect in the contrast media at L4-5, left, which was compatible with a herniated nucleus pulposus. The patient refused operation and was again treated conservatively. He recovered slowly and continued to take medications containing codeine for the next year. He developed chronic neurologic symptoms (atrophy in the

left foreleg, absent left ankle jerk, and paresthesias of the dorsum of the left foot). Back pain was a cardinal symptom. He was advised surgery and again refused. Instead, he chose to visit many physicians and received prescriptions for enough codeine (six to eight grains daily) to keep him "free of pain and buoyed-up enough to continue work." The industrial clinic he was attending refused to give him such large quantities of the narcotic and he began to forge prescriptions to obtain drugs. He was apprehended in district court and was sent to a state hospital as an inebriate. The codeine habituation was undetected and he experienced restlessness, depression with feeling of anxiety, irritability, periods of excitement, and indigestion. Sixty days later he was discharged, asymptomatic, to his home.

Early in 1954, two years later, he began to take terpin hydrate and codeine elixir NF, 8 to 12 ounces, daily until February, 1955, at which time he had difficulty in procuring the medicine and wished to withdraw voluntarily but was fearful he might again have the same withdrawal symptoms. He was therefore hospitalized (September 10, 1955) and given Chlorpromazine, 50 mg., intramuscularly, three times a day for three days, and 50 mg., orally, three times daily (total dose, 300 mg. daily), and the codeine preparation was reduced 50 per cent each dosage. He made an uneventful recovery and was discharged (fourteen days later) September 24, 1955, on 50 mg. four times a day to control psychomotor irritability. His attitude was good, his adjustment satisfactory, and he was anxious to return to work.

September 29, five days after discharge from the hospital, the patient complained of cough, dyspnea, nausea and anorexia. He had a temperature of 103.6° F. and was slightly icteric. Laboratory studies revealed a total white blood cell count of 2,300 and blood smear showed a predominance of lymphocytes. Chlorpromazine was discontinued, penicillin was administered and thirty-six hours later the white blood cell count was 4,000 (predominance of lymphocytes). Nausea was present. There were enlarged lymph nodes in the anterior cervical chain bilaterally, and laboratory tests revealed evidence of jaundice (total serum bilirubin 12.4 mg./100 cc. of serum). Thorazine was discontinued and the jaundice remained intense until October 12, when it began to disappear. It was evident, however, by laboratory tests (serum bilirubin 7.5 mg./100 cc. of serum) until October 20 when the tests were considered to be within normal limits (serum bilirubin total 2.1 mg./

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100 cc. of serum). The value for hemoglobin and results of leukocyte count, differential peripheral blood smear, heterophyle antibody titre, and liver function tests were all within normal limits. His appetite returned and he began to gain weight; his attitude and manner were healthy and his adjustment and capacity for work were considered to be normal. His overt anxiety was controlled with 2-methyl-2-n-propyl-1,3-propanediol dicarbamate.

Comment

The relationship between jaundice, agranulocytosis and Chlorpromazine administration has been previously reported.^{5,6} This case report more closely identifies these complications. A review of the literature failed to reveal simultaneous complications of this type. It is cogent to note that agranulocytosis may occur with or without jaundice, and that usually this complication is reversible with the withdrawal of Chlorpromazine. We believe it essential to examine the hemogram in patients exhibiting jaundice, who are taking Chlorpromazine, because of the possibility of agranulocytosis. This may necessitate (specific) antibiotic administration as well as discontinuance of Chlorpromazine administration. Hodges and LaZerte⁷ report a case of a sixty-seven-year-old woman who developed jaundice after Chlorpromazine therapy which did not subside and in whom agranulocytosis developed prior to death. Since the chemical structure of Chlorpromazine is thought to have a known toxicity to the hemopoietic as well as the biliary system, it is reasonable to assume these complications related. The pathogenesis of jaundice, however, in this case may be obscured. There

was no definite laboratory evidence of significant parenchymatous liver damage revealed by laboratory tests.

Summary

Complications are well known to Chlorpromazine therapy. Multiple complications are reported in an individual in whom Chlorpromazine was used to control withdrawal symptoms from drug habituation. If a physician were to assume that jaundice, due to Chlorpromazine therapy, would disappear with withdrawal of the drug, he may overlook agranulocytosis and a fatality may result without administration of antibiotics. In this instance, jaundice and agranulocytosis were both reversible with cessation of Chlorpromazine therapy.

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TESTICULAR TUMOR

(Continued from Page 730)

plasms has been presented, and a case of adenocarcinoma of the kidney with metastasis to the testicle is described.

Routes by which metastases can occur are related and attention is called to two possible explanations for some of the unusual metastases which occur.

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Seminar

Reactions to Penicillin

III. Reactions During 1952

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DESPITE the relatively low order of toxicity of procaine penicillin G in aqueous suspension given intramuscularly, we have emphasized reactions to this agent because it is the preparation most widely used at the present time. Part I of this study revealed that more than half of the reported fatal and severe nonfatal reactions to penicillin followed the administration of this agent. Part II showed that the incidence of mild reactions to this preparation in 1952 and 1953 in a specific group of patients at the Mayo Clinic was about 1 per cent.

Present Study

In an effort to determine the incidence of reactions to penicillin occurring at the clinic, the year 1952 was selected for study. To review the records of all the patients who registered in 1952 would have been an insurmountable task. Therefore, the records of 1,000 new patients in each of four months, namely February, May, August and November, were studied. A total of 410 of these patients received penicillin (Table I). This indicates that approximately 10 per cent of the new patients who registered at the clinic in 1952 received some type of penicillin.

We were also interested in determining how many of the patients who received penicillin had reactions. For this reason, all records bearing the diagnosis "drug allergy to penicillin" in 1952 were reviewed. We were able to find 859 records with this diagnosis. Of these, 733 were excluded because the diagnosis proved to be on the basis of past history alone. Examination of these 733 records revealed that six patients (0.8 per cent) experienced reactions that were interpreted to be of the immediate anaphylactic type; one of these reactions resulted in loss of consciousness. We

further noted that 460 (0.8 per cent) of the total number of new patients registered in 1952 (61,438) gave histories of reactions to penicillin. The accuracy of these figures can be questioned, of course, because the history of a reaction of

TABLE I. SAMPLING TO INDICATE NUMBER OF PATIENTS RECEIVING PENICILLIN IN 1952

Number of Records Reviewed	Month	Number of Patients Receiving Penicillin
1,000	February	124
1,000	May	105
1,000	August	101
1,000	November	80
Total 4,000		410

any type is difficult to evaluate. Excluding these 733 records, we were left with 126 patients who received penicillin at the clinic in 1952 and were recorded as having experienced reactions. We excluded fifty-seven of these from this analysis because of the concomitant administration of other drugs that could have been responsible for the reaction or because there were insufficient details regarding the reaction; it is possible that some of these reactions actually were caused by penicillin. Seven additional records were discarded because the indexing was in error.

This left a total of sixty-two patients who experienced reactions after the administration of penicillin at the clinic in 1952. However, only twenty-three of these sixty-two patients represented new registrations in that year. As previously noted, it was estimated that approximately 6,000 new patients received penicillin, which means that a reaction to penicillin occurred in about 0.4 per cent. In the group of fifty-seven patients in whom we could not be sure as to the cause of the reaction, thirty represented new registrations in 1952. When this figure is added to the twenty-three who had certain reactions, the percentage increases to about 0.9 per cent. Therefore, the actual incidence of reactions lies some-

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The Mayo Foundation, Rochester, Minnesota, is a part of the Graduate School of the University of Minnesota.

REACTIONS TO PENICILLIN—WELLMAN AND CORR

TABLE II. COMPARISON OF INCIDENCE OF REACTIONS TO PENICILLIN

Agent Causing Reaction	Rate of Reaction, Per Cent
Procaine penicillin G in sesame oil (1948)	0.75
Penicillin, all types (1952)	0.4-0.9
Procaine penicillin G in aqueous suspension (1952-1953)	1.0

TABLE III. DATA ON FIFTY-FIVE PATIENTS WHO HAD REACTIONS TO AQUEOUS PROCAINE PENICILLIN G IN 1952

Category	Patients	Per Cent
Male	29	53
Female	26	47
Asthma	3	5
History of previous reactions to penicillin	6	11
Age, years		
0-9	1	2
10-19	1	2
20-29	8	14
30-39	11	20
40-49	8	14
50-59	7	13
60-69	10	18
70+	9	17

where between 0.4 and 0.9 per cent. When these figures are corrected by the method applied in Part II of this study for limitations in the period during which these patients were followed, the incidence actually might be nearer a range of 0.5 to 1.2 per cent. Table II shows that these figures compare favorably with those observed in 1948, 1952 and 1953.

Analysis of the sixty-two patients in whom reactions to penicillin developed reveals that fifty-five received intramuscular injections of procaine penicillin G in aqueous suspension. Since we were primarily interested in a study of this drug, we have recorded information concerning these patients in detail. These reactions occurred in all age groups and were equally divided between male and female patients (Table III). Only 11 per cent of these patients gave histories of previous reactions to penicillin and only 5 per cent were known to have had asthma. This would indicate that in this group of patients neither the history of asthma nor a previous reaction to penicillin is of great importance in the development of this type of reaction. Table IV indicates that the number of injections of penicillin received by a patient has little or no influence on the occurrence of a reaction. As might have been predicted, Table V indicates that most of these reactions were of the mild cutaneous type. There

were no anaphylactic reactions in this group. The reactions usually developed within a week after the last injection and most of them had disappeared by the end of a week.

TABLE IV. NUMBER OF INJECTIONS OF AQUEOUS PROCAINE PENICILLIN G RECEIVED BY EACH PATIENT

Injections Per Patient	Patients	Per Cent
1	12	22
2	7	13
3	10	18
4	6	11
5	4	7
6	4	7
7	5	9
8	2	4
9	1	2
10+	4	7

TABLE V. REACTIONS TO AQUEOUS PROCAINE PENICILLIN G IN 1952

Feature	Patients	Per Cent
Type of reaction		
Febrile	1	2
Joint	3	5
Cutaneous	51	93
Day of onset after last injection (when known)		
Less than 8 days	40	75
8-14 days	10	19
More than 14 days	3	6
Duration of reaction (when known)		
Less than 8 days	24	66
8-14 days	6	17
More than 14 days	6	17

Summary

Ten per cent of the new patients who registered at the Mayo Clinic in 1952 received some form of penicillin. Unquestionable reactions to penicillin occurred in 0.4 per cent of these patients. At the same time, an additional 0.5 per cent of these patients had reactions that could have been produced by penicillin but that may have been caused by another drug. Therefore, the true incidence of reactions is between 0.4 and 0.9 per cent. Analysis of the records of fifty-five patients who received intramuscular injections of procaine penicillin G revealed that most of the reactions were of the mild cutaneous type. It was impossible to determine any factor of pronounced significance in the characteristics of these patients that influenced the occurrence of reactions to penicillin.

Current Concepts

Functional Manifestations in Organic Cardiovascular Disease

GEOFFREY BOURNE
London, England

In many patients an exact separation between functional and organic cardiac symptoms and signs is difficult. The admixture or association of the two occurs in various ways. Perhaps the commonest is that caused by an unnecessarily serious and pontifical medical opinion in the case of a patient who has a perfectly well compensated slight and nonprogressive organic cardiac lesion. Aortic regurgitation of such a slight degree as to cause no left ventricular hypertrophy or dilation or fall in the diastolic blood pressure, a leak in the mitral valve similarly without cardiac enlargement, or indeed a slight degree of stenosis of it, may give murmurs which are the only proof that the heart is in any way abnormal. Moreover such minor abnormalities may remain unchanged for many years. The untutored clinical judgment may be sufficiently uncertain as to whether to dismiss such a murmur as being of no clinical importance to the patient, or whether to play for safety and give a guarded opinion. This clinical uncertainty raises even larger uncertainties in the patient, who senses the opinion of his physician.

Similar misapprehension regarding the importance of a definite organic cardiac manifestation may arise from the patient's own brain or central nervous system, rather than from that of the doctor. A small well-healed and well-compensated myocardial infarct may arouse fears in the patient's mind which lead to the development during convalescence of the typical functional syndrome with heart consciousness, palpitation, a dull left chest ache, and an associated state of anxiety. It is most important in such circumstances for the doctor to be sure, and to transfer his certainty to the patient, that such a functional state has no pathologic or clinical relationship to the preced-

ing myocardial attack. If it can be stated truly and firmly that the patient's own nervous system is the cause of the new pain, the symptoms and the anxiety are likely to subside.

Furthermore, the thump of premature beats, themselves of no significance, may as it were knock at the door of the patient's chest, remind him of his heart, and institute similarly a functional syndrome. Paroxysmal tachycardia with no other evidence of disease may have the same result.

Mitral stenosis, perhaps, rather more commonly than other forms of organic disease, is apt to cause a clinical picture in which functional symptoms are intermixed with those due to the organic lesion. The slapping impulse so characteristic of this condition not infrequently rises into consciousness, induces the nervous symptom of palpitation, and precipitates functional left chest pain.

The nervous factor is extremely important in hypertension. This occurs in two ways. An excitable visceral nervous system in quite a young adult may easily provoke a nervous cardiovascular reaction during examination. The heart rate will be raised from 90 to 120 or more, the heart action will be vigorous and excitable, and the blood pressure reading may be as high as 170/100. In such cases there is no other abnormality to be found radiologically, in the cardiogram or in the retinal vessels. Furthermore, when the blood pressure is taken with the patient no longer excited normal figures are found. This condition of nervous hypertension is usually quite latent, so far as the patient is concerned, and is only revealed by a routine medical examination for insurance purposes or for military service. If the examining physician is wisely silent about the situation, no further troubles follow. If the state of affairs is mistakenly labeled hypertension the consequences to the patient's future morale may be serious.

(Continued on Page 753)

Dr. Bourne is Physician-in-Charge, Cardiological Department, St. Bartholomew's Hospital, London, England. This is the last in a series of four articles by the author on this subject.

Continuation Studies

The Genesis of Intestinal Atresia

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J. H. LOUW, Ch.M.
Cape Town, South Africa

The first case of congenital occlusion of the intestine was probably recorded by Osiander in 1797. A few years later Meckel published the first paper on the probable genesis of this anomaly, and since then various views on the causation of intestinal atresia have been expressed. Most of these were based on isolated morbid anatomical findings or indirect experimental evidence and can be briefly summarized under three main headings:

1. *Developmental Defects:* Under this heading we group the theories of Meckel, Bland-Sutton, and Tandler, who explained the anomaly as a failure of the correct development of the foetal gut.

2. *Foetal Accidents:* Here intra-abdominal catastrophes, such as intussusceptions, volvuli, kinks, et cetera, were blamed for the atresia.

3. *Foetal Disease:* Foetal peritonitis or ulceration were incriminated by some investigators.

When all these theories are studied in more detail it becomes certain that one view cannot explain all cases of congenital intestinal atresia.

In 1952 Louw reviewed seventy-nine consecutive cases of atresia and severe stenosis in newborn infants at the Hospital for Sick Children, Great Ormond Street, London, and noted that certain features of the anomaly suggested that some atresias may be due to interference with the blood supply to a portion of foetal gut. These features include the following: (1) Anomalous vascular supply to the atretic portion, e.g., a V-shaped defect in the mesentery. (2) Early necrosis of the proximal blind end before the tension in this area has risen to any extent. This occurred in 20 per cent of the cases, and in half of these cases the infant was less than forty-eight hours old. (3)

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Dr. Louw is Professor of Surgery, University of Cape Town, South Africa.

Postoperative atony and ileus in apparently healthy blind ends anastomosed to the distal bowel.

Similar observations have been reported by other workers and four cases seen during 1953 and 1954 at Groote Schuur Hospital, Cape Town, further strengthened our belief in the vascular hypothesis. In one case an infant was born with aplasia of the descending and pelvic colons; at autopsy there was complete absence of the inferior mesenteric artery. The second case was of an infant operated on for ileal atresia, whose resected specimen clearly showed the remnant of an intussusception in the distal segment. In the third case—a newborn infant with intestinal obstruction—the ileum clearly showed the presence of a volvulus which was presumably responsible for the atresia. The fourth patient was an infant with intestinal atresia, in whom it was found at operation that a congenital band had caused infarction of the bowel and was probably responsible for the atresia.

Although strangulation causes infarction of the bowel followed by gangrene perforation and peritonitis in postnatal life, the train of events is different in the sterile foetal bowel. Here strangulation results in the absorption of the infarcted segment with, at the most, a complicating meconium peritonitis.

The question may be asked, "But how do we know that the vascular interference precedes the atresia and not atresia the vascular occlusion?" Thus more substantial experimental proof was sought in the following manner:

Operations were done upon dogs *in utero*, ligating the mesenteric vessels which supply a short segment of the small bowel. The mother dog was then allowed to go to term. In puppies so operated upon and sacrificed soon after birth, the bowel proximal to the infarcted segment was found to be distended, ending in a bulbous tip. The bowel

(Continued on Page 753)

Cancer Detection

Minnesota Doctors are Beginning to Detect Occult Cancer

The Cancer Committee
Minnesota State Medical Association

The results of 196 cancer detection examinations have been received in the Cancer Committee office from 182 practicing physicians in Minnesota. This brief report covers the period from January 1, 1954, to September 30, 1956. The number of patients is small; the results are impressive.

Seventy-three men and 123 women have been examined, and four occult cancers have been detected; two adenocarcinomas of the rectum, one malignant rectal polyp, and one carcinoma *in situ* of the cervix.

Gastric analyses were performed on seventy-seven people, and in sixty-two the results indicated the need for gastrointestinal x-ray examination, (forty-nine hypochlorhydric and thirteen achlorhydric). Fifty-five patients did not receive a gastric analysis. The value of this procedure in screening for those persons requiring yearly gastric x-rays is well established. This should be an integral part of the detection examination.

Precancerous conditions have been noted in thirty-nine people, or 20 per cent of the group reported so far. In the Cancer Detection Research Center, 28 per cent of people have similar precancerous lesions. The examining physicians found thirty rectal and colon polyps, one thyroid nodule, six senile keratoses, one oral cavity leukoplakia, and one suspicious pigmented nevus. In addition, suspicious findings were noted in ten examinees, and these patients are receiving treatment or are under observation by their own physician or a consultant. Included in this group were the following: questionable breast mass 1, adenopathy, generalized 1, questionable lung lesion 1 (surgery advised), suspicious neck nodules 2, and unexplained rectal bleeding 1.

The medical societies of fifty-seven of our eighty-seven counties have expressed their willingness to carry on this program of thorough screening of well persons for occult cancer. Approx-

mately 7 per cent of our physicians are taking part so far. We hope all physicians will actively participate in this state-wide effort such that the annual cancer screening examination will become as well rooted in our practice as routine chest x-rays and immunization procedures.

The benefits to be derived from this co-operative state-wide effort are incalculable. We invite the practicing physicians of Minnesota to join in a cancer crusade, and to make their examination results available for statistical study by forwarding the history and examination results to the Cancer Committee, care of the State Board of Health, University of Minnesota.

There are now more than 20,000 voluntary public health agencies in the United States.

* * *

Small lesions, suspected of being cancerous, should be excised with wide borders of apparently normal tissue, rather than invade the tissue with a small biopsy.

* * *

The prognosis of properly treated cancer of the skin is excellent.

* * *

When one-third or less of the retina is involved in retinoblastoma, there is reasonable hope that it may be destroyed by radiation therapy.

* * *

Public health operation of cancer prevention-detection clinics can serve only a small fraction of the population because annual re-examination of patients lowers the number of new admissions to the service.

* * *

Effective cancer control depends on a continuous program of public education, the object of which is to substitute optimism and intelligence for ignorance and fear.

* * *

Hodgkin first described the disease bearing his name in 1832.

* * *

The first illustration of the microscopic appearance of the blood in leukemia was shown in 1852.

* * *

The first photograph of a patient with leukemia was published in 1862.

MINNESOTA MEDICINE

Editorials

JOHN F. BRIGGS, M.D.
ARTHUR H. WELLS, M.D.
HENRY G. MOEHRING, M.D.

INSULIN REACTIONS

Some diabetic patients do not like to use insulin because they fear insulin reactions. While it is true that combative behavior, unconsciousness, convulsions, and even erroneous arrest for drunkenness may result from hypoglycemia, it is likewise true that most of these unfortunate occurrences, as well as mild reactions, can be prevented by proper education of the diabetic patient. Indeed, each patient, early in the treatment of his diabetes with insulin, should be told how to recognize and treat insulin reactions.

Most patients, while undergoing an insulin reaction, notice a relatively abrupt onset of hunger, sweating and tremor. As the reaction progresses, they may have slurred speech, diplopia and confusion, followed by unconsciousness and convulsions. It is less commonly recognized that with the prolonged action of the insulins used today, some patients may have mild but extended reactions manifested by fatigue, headache, irritability, or impairment of their ability to think and communicate.

Every diabetic who takes insulin should have available at all times a supply of sugar or food containing sugar to use as soon as he feels the onset of a reaction. Failure to do so may permit an otherwise harmless reaction to progress to the point at which the patient loses his ability to take steps to correct the hypoglycemia.

Reactions are the result of too much insulin relative to the needs of the patient and may come from an overdose of insulin, failure to follow a diet, omission of part of the diet, or, more commonly, failure to eat meals on schedule or exercising more than usual. Hence, to minimize the risk of insulin reactions, the patient should measure his insulin carefully, keep his daily food intake constant, eat his meals on schedule, and avoid prolonged exertion that has not been planned for by reducing the dose of insulin that day or eating extra food.

Other members of the family should be told about the symptoms and treatment of insulin reactions. This is especially important in the case of children, the occasional patient who has trouble recognizing insulin reactions, and elderly persons

who have mental impairment. With special reference to children, it is important that their teachers, their playmates, and the parents of their playmates be alerted to the problem of insulin reactions. Finally, each person who takes insulin should carry on his person a card stating that he takes insulin and should be given sugar in case he is found unconscious or behaving strangely.

RAYMOND V. RANDALL, M.D.

THE MEDICAL STUDENT COMMITTEE

The Minnesota Medical Student Committee is an organization of medical students at the University. It is a well-established student organization, respected by both faculty and students. However, it is fairly young, being officially recognized by the University since December, 1951. During these few years it has become accepted as a liaison between students and faculty and as an active body working in the interest of both groups.

The members of the committee are the elected officers of each of the four classes in the medical school; thus, it is a representative organization. It functions largely as a student council; in fact, it has come to be called the Medical Student Council. The original name of the Council was Medical Student's Advisory Committee, which was later changed to The Medical Student Committee. The dean and the assistant deans are ex-officio members. Except for an occasional visit from some other member of the faculty, this organization works largely through the dean's office.

The purpose of this organization is to advance the interests and well being of all medical students and the University. It meets monthly during the school year to carry out this objective.

During the past four years some remarkable changes have taken place in the medical school. The Medical Student Council has certainly been a factor in some of these changes. An orientation program for the freshmen has been instituted. An introduction to the clinical years has been adapted for the juniors. A new grading system is coming into being. Library privileges have been broadened for the medical student. Medical students have met with and appeared before the Administrative Committee of the Medical School. Many other

changes have taken place, too many to mention here.

Anyone reviewing the work of this Committee is struck by how frequently the same items keep coming up from year to year. This is true in spite of the fact that each council has new members and new officers. Certainly, many of the problems which come before the Committee must have been present ten, twenty, thirty or more years ago. In the hope that the current problems of the medical student will be of interest to you, a discussion of some of the current business of the Medical Student Committee will be presented here at a later date.

RALPH B. SWANSON
University of Minnesota

THE MINNESOTA HUMAN GENETICS LEAGUE

On July 6, 1856, Charles Fremont Dight was born in Mercer, Pennsylvania. His parents could not have guessed that their sixth and last child would leave an imprint of such great significance upon Minnesota and the world. It is hoped that this series of six sketches will demonstrate the subtle, but fundamental, contribution made by Dr. Dight to society and to medicine and that it will be commemorative of the centennial of the birth of this unique individual.

Dr. Dight was directly responsible for the founding of the Minnesota Human Genetics League. Therefore, an account of his life is essential to an introduction to the League.

Due to the accident of birth, Dr. Dight partook of the culture of the middle of the nineteenth century, and had the crusading zeal and fire of the intellectuals of that time. The questions of those days included the abolition of slavery, Utopian community experiments, the formation of new political parties, temperance, and many social and economic reforms. Over the door of his famous "bird house" residence, which was built around a tree near Minnehaha Falls, hung the motto, "Truth shall Triumph; Justice shall be Law," a quotation from a sermon on the slavery question delivered in July, 1854, by Theodore Parker in Boston. This nineteenth century devotion to progress was thrown into the attack on twentieth century problems. One of these later crusades was to become the all absorbing one for Dr. Dight. This was the eugenics movement.

Mendel's laws of heredity were discovered by

the scientific world in 1900. Dr. Dight realized that the laws might be used for the improvement of mankind with methods similar to the techniques used by the livestock breeders. He predicted the almost immediate triumphs of plant and animal breeders, which resulted in our huge agricultural surpluses of today. He recognized man's resistance to self improvement, in his statement that, "It may be foolish to try to change things from what they are to something that might be better, but it affords a little pleasure to do the trying." He always had a petition in his pocket.

Dr. Dight received his medical degree from the University of Michigan in 1879. He then served as health officer of Holton, Michigan. Following this there was a long period of foreign travel in the Near East and Europe. Upon his return to the United States he became acquainted with Minnesota as the resident physician of Shattuck School in Faribault. After more travel, he returned to take up permanent residence in Minneapolis. In 1899, he joined the faculty of the Hamline University Medical College and remained on it until Hamline's medical department was amalgamated with the University of Minnesota Medical School. He remained on the staff of the latter institution for six years. Dr. Dight was the first medical director for the Minister's Life and Casualty Union.

Despite the fact that Dr. Dight's salary probably never exceeded \$1500 until he was over seventy years old, his frugal living and wise investments created an estate of some \$200,000 which he left to the University of Minnesota. The bequest was to be held in trust, the income to support a center for eugenics. He never paid any income taxes. How times have changed!

Charles F. Dight, M.D., was a man of great stature. He was brilliant, unusually well informed, widely traveled, and got large returns on his investments of every kind. We will see what these intellectual investments produced later on. At the moment it will suffice to emphasize the breadth of his understanding of the problems of mankind and his compulsion to do something about many of them. This dedication of spirit in itself demands that the centennial of his birth be recognized in an appropriate fashion.

SHELDON C. REED

Dight Institute for Human Genetics

First in a series of articles on Dr. Dight's contributions to medicine and society.

THE NEED FOR HOSPITALS AND RELATED FACILITIES IN MINNESOTA

Although \$127 million has been or is being spent in the State to build hospitals and related care facilities from 1948 through 1956, Minnesota has met only 82 per cent of its calculated needs for general hospital beds. Based on the standard of four and one half beds per thousand population for the state as a whole, Minnesota needs at least 2,546 more beds in general hospitals.

The latest survey made by the Minnesota Department of Health reveals that there are 192 general hospitals in Minnesota with a total normal bed capacity of 13,907. This figure includes the beds in use in Rochester hospitals which serve large numbers of patients from outside the state. It also includes 1,264 beds in hospitals which are non fire-resistive and should be replaced.

Communities throughout the state are rapidly recognizing their responsibilities for providing modern hospital facilities and are making provision for replacing the older non-fire-resistive structures and for expanding and modernizing existing hospitals which lack the needed areas and services. Some of the major changes being made include: improvements in surgical and obstetric suites with separate scrub-up and clean-up areas; the provision of a separate nursery work room and sufficient space in the nursery to allow for the proper spacing of bassinets and permit individual care techniques; the provision of an adequate central supply, laboratory and x-ray facilities, nurses' stations, utility rooms and storage areas, as well as improvements in food and formula preparation and dishwashing areas. The replacement of bed areas which may be lost in remodeling, as well as needed additions to some of the hospitals which are now overcrowded, are resulting in rather sizable building programs in some communities. In some cases it has been decided by the community that the existing hospital, because of its age and inadequacies, does not justify a large expenditure of funds and a new hospital has been built.

It is estimated that there is now a total of \$108 million in proposed hospital construction in various stages of planning. When a community builds a modern hospital, the old hospital is frequently remodeled, protected with an automatic sprinkler system and used as a nursing home, boarding care home or home for the aged. This will meet, temporarily, a small part of the very critical need for facilities for the care of our older people.

The Hill-Burton program and the recent grant of almost \$5½ million to Minnesota hospitals by the Ford Foundation are providing a very real stimulus in the hospital construction field. Since Hill-Burton funds are so limited, it is impossible to meet more than a very small number of requests each year. Actually, only 16.8 per cent of the total construction completed since 1948 has received Hill-Burton assistance. Minnesota's share of the \$102.8 million appropriation under the Hill-Burton program for fiscal year 1957 was \$2,175,798. If the total amount as authorized in the Act were appropriated (\$150 million), Minnesota's proportionate share would become somewhat more meaningful in the total picture of needs. The Hill-Burton program has now been extended through the fiscal year 1959. This program is administered by the Minnesota State Board of Health, with the assistance and advice of the State Advisory Council on Hospital Construction. It has frequently been stated by hospital authorities that the Hill-Burton program has been one of the best subsidy programs to come out of Washington. With Minnesota's needs, its population growth and the increasing number of older people, the program could very well be expanded to its maximum capacity and continued for many more years.

HELEN L. KNUDSEN, M.D.

REHABILITATION IN PULMONARY TUBERCULOSIS

Renewed Interest in Great Britain

The first sign of renewed interest in rehabilitation of the tuberculous in England came during World War II. The scheme was named after the official number of the Government Regulation, "266/T." Although it may be said its origin lay in the necessity for manpower in wartime, nevertheless, we must admit that it was the first real advance beyond mere medical aftercare; the patient could get help, though more in kind than in money, to enable him to return to work.

The hopes that this would lead to further, much-needed advances in social medicine were realized in the passing of The Disabled Persons Employment Act in 1944. The government took powers to set up a public corporation to run Remploi factories. By 1951, ninety factories, all nonresidential, were set up in areas with most need as judged by the Register of Disabled Persons, and seven were

This is the sixth in a series of editorials on pulmonary tuberculosis.

allocated for the tuberculous. Up to March, 1955, 944 tuberculous persons had been admitted, of whom 428 had been placed in open industry. The others, apart from those who have been found unfit for any work or have died, have continued employment at hours agreed by the physicians in charge, their pay envelopes being made up to a living wage as necessary from other statutory sources, such as public assistance.

The government also set up fifteen Industrial Rehabilitation Units; all but one are nonresidential. These are for the "toning-up" of all disabilities. The patient with negative sputum and likely to be able to work a full day within some twelve weeks of entry can be accepted. In addition, sixteen training centers were established; there the sputum-negative patient fit for an eight-hour day can have training to work considered more suited to his physical state and functional ability. The average stay is twelve months.

It will be seen that these two latter, the rehabilitation units and training centers, do not cater for two types of patients, the first with such loss of functional ability that he cannot reach an eight-hour day within some months or years; the second with a continued or recurring positive sputum. Moreover, all three government services share the disadvantages associated with travel to and from the patient's home. Here then was the opportunity for the Voluntary Rehabilitation Center, and fortunately Section 15 of the Act had said that government help would be given to such a center provided it could supply the necessary industrial training facilities. Negotiations between the Papworth Committee of Management, the Ministry of Labor, and the Ministry of Health led to what was called "The Ministry of Labor Training Scheme for the Tuberculous."

From the time when he enters industrial training at three hours per day, the patient-worker draws allowances for himself and for his dependents. These allowances can continue for two years, or longer if the medical authorities of Papworth consider this necessary. For such time as the patient is not at work he follows the regime of treatment laid down by his medical officer.

The need for such a scheme for those willing to accept it is shown by the following facts. In 1954, 30,000 tuberculous people were drawing special rates, while between 1950 and 1954 the number of the tuberculous on the register of disabled persons had risen by 8,000, although (and

this is a most significant fact for those who think tuberculosis is conquered), the total for all disabilities lumped together had fallen by more than 6,000.

R. R. TRAIL, M.D.

AMERICAN ACADEMY OF OCCUPATIONAL MEDICINE

In February, 1956, the American Academy of Occupational Medicine celebrated its tenth anniversary. On that occasion it was quite natural that the Academy should take stock of itself and examine its position in the world of occupational health. Without feeling complacent or smug, the Academy may justifiably take pride in its achievements.

The American Academy of Occupational Medicine differs from other organizations in its field by limiting its membership to physicians who devote full time to some phase of industrial medicine; but merely being "full time" does not of itself qualify a candidate for acceptance into the Academy ranks. A standard of quality in training and performance acceptable to the board of directors is also required. Qualifications for fellowship in the Academy are as exacting as those of the recently established specialty board in occupational medicine.

It is often stated that American medicine is over-organized. If this is true, how does one justify the formation of another organization? One answer is that any effort directed toward raising standards of practice is justifiable, provided, however, that the effort can be shown to bear fruit. An examination of the American Academy of Occupational Medicine in its tenth year amply vindicates the wisdom and vision of its founding fathers.

The Academy has held eight annual meetings, each with two or three days devoted to scientific sessions. Attendance has never been less than one half of the active members—a remarkable record even for an organization whose membership now numbers about 250. The meetings are characterized by a freedom of discussion rarely encountered in other medical gatherings. The proceedings of these meetings are published and distributed by the Academy.

The Academy has assisted other groups in organizing industrial health symposia and recently was requested by the American Board of Preventive Medicine to help in developing the examination program for candidates for certification as

specialists in Occupational Medicine. Other activities of the Academy include the planning of short, intensive courses in occupational health and steps to collaborate with the American Medical Association and the I.M.A. in setting up and maintaining standards for in-plant medical programs. Thus in many ways, the American Academy of Occupational Medicine is contributing significantly toward a "new look" in industrial medicine and toward giving proper status and stature to the qualified industrial physician.

L.J.G.

TELEPHONE SERVICE

Northwestern Bell Telephone Company's expenditure for construction in Minnesota amounted to almost \$26,000,000 in 1955, a record for any one year in the history of the company's operations in the state. This year, the firm's construction program will amount to even more—about \$33,000,000. During the past ten years, Northwestern Bell has spent a total of more than \$190,000,000 in an effort to provide the buildings, central office equipment, poles and wire required to give the people in its exchanges the telephone service they want and need. Northwestern Bell provides telephone service in more than 135 Minnesota communities, and operating these exchanges makes it one of the state's busiest industries.

The company's business has grown fastest in the more recent years, a good indication of which is the gain in the number of telephones. So far in 1956, Northwestern Bell has added 31,600 phones, bringing the total number of telephones it operates in Minnesota to 870,390. After the first phones were installed in the state more than seventy-five years ago, it took some sixty years to reach the 420,000 mark—half of today's figure—but only the last fifteen years to double that number.

Last year, the company's 837,200 phones handled an average of 4,500,000 local calls and 93,150 long distance calls per day. This is an increase of 60 per cent in the volume of local calls and a gain of 95 per cent in the number of long distance calls over the corresponding figures for 1945, which were 2,840,000 and 47,750, respectively.

Besides expanding facilities to meet new demand for service, Northwestern Bell is also busy with a continuing program of telephone service improvement to provide its customers with modern dial equipment. Last year, telephone service was

changed from manual to dial in nine Minnesota communities. Eighty-eight per cent of all the Bell telephones in Minnesota are now dial, and eventually, all of the company's exchanges will have dial service.

Despite this program of mechanization, the number of Northwestern Bell employees in Minnesota has increased almost 50 per cent in the past ten years—from 6,100 in 1945 to 9,100 at the close of 1955. The telephone company's Minnesota payroll last year amounted to \$36,700,000.

One of the most important activities keeping Northwestern Bell people occupied is that of making preparations for future improvements in service. One of these, which will be introduced in this state next year, is called direct distance dialing. This is an arrangement which will permit telephone users to dial many of their own long distance calls themselves without going through an operator. Already, operators in twenty-two Minnesota exchanges are able to dial numbers in distant cities straight through to their destination. This is the step just ahead of direct distance dialing by telephone users themselves.

NORTHWESTERN BELL TELEPHONE COMPANY

INSIDE LOOKING OUT

Television is not all controversy and debate, commercials and color, chaos and conjecture. To a vast majority of the 37-million TV families in the United States, it's a friendly adjunct to their home life; not an ogre in the front room. If they like a program, they watch it. If they don't like a program, they watch another—or turn the thing off.

To the folks who make their living in television, it's a fascinating, demanding, exciting life—and it's a lot of fun. When it stops being fun, many of them get out of it . . . and feel pretty lonesome.

It has the constant gnawing knowledge that any mistake made on television is immediately visible in thousands of homes. It has the reassurance that most people seeing the mistake will smile and say: "Well, the guy's human." It has the certainty, too, that quite a few of the thousands seeing the error will grab postcards and start out a message with "you stupid bum, why did you . . ."

It has the sometimes embarrassing ability of making an ordinary fellow recognized and greeted by strangers on the street. You sneak into a burlesque theater, your collar turned up, only to

be petrified by the doorman's ringing voice exclaiming, "Hey, ain't you Joe Smith I see on television?"

It has an uncanny ability to unmask the phony; of revealing the performer who thought, "I'll just ad lib my way through it. . . ." An unprepared individual—suddenly stabbed by the knowledge that he's looking straight into several thousand eyes, quite frequently is stricken dumb—with the forlorn expression of the fellow who was just sitting there reading the Sears and Roebuck catalogue when the tornado lifted the little house and carried it away.

It has the deceptive simplicity of a drape, a desk, and a couple of bright lights—with \$40,000 worth of delicate electronic equipment glaring at you coldly and magnifying every wrinkle, every beard shadow, and every self-conscious smirk.

It is, in the words of Eric Sevareid, as easy as charting simultaneously the movements of each one of thirty-seven bats suddenly let loose in a closed room.

All you need in television is a thick skin—but sensitivity; an ingenious mind—but not too much imagination; courage—but no condescension; a warm personality—but no gush. That's all you need in television.

And all you need to climb Mount Everest is a pair of hobnail boots and a coil of rope.

GENE GODT
WCCO Radio and TV

THE ARCHITECT'S ROLE

"He who is his own lawyer has a fool for his client . . ." from a book of proverbial folklore published in 1875. That saying has been quoted many times in the past three quarters of a century and is heard frequently today.

This same book on proverbial folklore does not contain a familiar quotation that would apply to those people who would attempt to serve as their own architects. Perhaps the American Institute of Architects (the national organization of the architectural profession) should sponsor a contest that would produce a slogan comparable to the one that has been quoted so much by members of the legal profession. It would appear that there are more people today who feel qualified to serve as their own architects than those who would dispense with legal services.

This is the second in a series of editorials on the subject of the architect.

Some doctors in their consideration of a building program fail to appreciate the contributions by architects. Often in the planning of small projects such as a residence or a small clinic, the M.D. puts his hands on pencil and paper and simply assumes he has "sufficient architectural tools" to proceed with a project. Perhaps this is due to the fact that architecture is a calling that brings out the "do-it-yourself" in many people. There are other fields that nonprofessionals assume they can enter with little education or experience. Journalism is one. Detective work is another.

A real understanding of the architect's role will point up the need for his services and why a doctor or any other potential building owner should engage an architect. Essentially, an architect seeks to achieve for his client a building which satisfies that old Roman definition of Vitruvius, "Well, building hath three conditions: firmness, commodity and delight." His first job is to understand purpose, requirements and limitations of structure which the client has in mind, then to combine those ideas with his own professional experience in planning and building. If the architect is consulted on a remodeling job, he inspects the building to be remodeled and advises as to the approximate realty value; practicality of making changes; present condition and quality of construction.

The architect visits the property, or if it has not been purchased yet, helps select it, budgets the cost.

Then he develops sketches of the structure, in rough form, showing size and arrangement of the rooms and general characteristics of the building. These preliminary drawings are examined and re-examined to be sure that the client understands what he is getting—in appearance and function.

Next, the architect prepares the working drawing of plans, elevations, sections and details which show construction and kind of material, together with notes and schedules. Drawings are also made of the plumbing, heating, air conditioning and electrical installations, of structural steel and reinforced concrete work. An architect's legal knowledge comes into play, for building codes must be considered, as well as other ordinances and regulations. He also writes the complementary specifications which establish the quality and assembly of every item going into the construction of the building, from foundation concrete to hardware. These drawings and specifications are the builder's

guide, and when followed, the building will be as the client and the architect planned it.

The architect then helps choose contractors who bid on the work and who have made cost estimates from the architect's plans and specifications. The architect recommends the final selection of the contractor; assists in preparation of contract agreements which define general conditions, contract price, time limitations, manner of payment to the contractor, et cetera.

As construction proceeds, the architect makes periodic inspections of the work to see if it is being erected in full compliance with drawings and specifications. As the contractor sends in his bills, the architect keeps a running account of the cost of the building and certifies payments to the contractor.

When the project is finished, all required tests made, and the usual guarantees received from contractors, his normal services as architect have been completed.

Throughout planning and execution of the structure, it is the architect's obligation to know the intricacies of approximately 125 trades which confront him daily. Particularly on large projects, he co-ordinates the techniques of other specialists and consultants; the structural, mechanical, electrical, acoustical, and civil engineers; landscape architect; kitchen, hardware and laboratory equipment consultant; lighting and color consultants. Many members of these related fields devote their entire professional lives to co-operation with architects.

An appreciation of the architect's services is the most cogent reason for retaining those services.

ROBERT E. HOWE, A.I.A.

Associate Architect

Haarstick Lundgren & Associates, Inc.

A good college health program consists of far more than caring for the immediate needs of sick and injured students and teaching them good health habits. It has the responsibility of preventing illness or injury when possible, keeping aware of sanitary and environmental conditions that may be harmful and making appropriate recommendations, serving as an educational center for dissemination of information that may favorably affect the health of the community, and referring patients to specialized services when needed.—DANA L. FARNSWORTH, M.D., *Bulletin NTA*, May, 1956.

NOVEMBER, 1956

ORGANIC CARDIOVASCULAR DISEASE

(Continued from Page 744)

A second and more important manifestation of a functional reaction is present in the form of a nervous or functional superstructure imposed upon true organic hypertension. It is impossible to be certain, from the blood pressure figure alone and an isolated observation, how serious the underlying permanent hypertension is. The following facts must always suggest that the sphygmomanometer figures in such a case have greatly exaggerated the severity of the underlying disease—the presence of considerable tachycardia at the time of the examination, other evidences of nervousness in the patient, a perfectly normal cardiogram with upright T waves in the left ventricular leads, and R waves that are of normal amplitude, a normal or even a small vertical cardiac silhouette on x-ray screening, normal retinal arteries free from shininess, diminution in size, irregularity, tortuosity, and arteriovenous nipping.

In such people the hypertension is probably mild or benign. Such a conclusion is reinforced if the findings remain unchanged at subsequent examinations made at long intervals of time. Indeed, it is often found that the figures which were high at the time of the first examination remain subsequently at a considerably lower level.

GENESIS OF INTESTINAL ATRESIA

(Continued from Page 745)

distal to the infarcted area was normal but completely collapsed. The infarcted segment was found collapsed in various stages of disintegration, depending on how soon the puppy was born after the interference with the ileal blood supply. In the puppies born more than ten days after surgery, the infarcted bowel was entirely represented by a fibrous strand. An anomaly of the gut identical with that found in infants with ileal atresia resulted.

These successful experiments, together with the other observations, constitute some proof that at least a certain number of intestinal atresias are due to a vascular accident causing infarction of a segment of the foetal bowel and absorption of the affected segment resulting in atresia.

President's Letter

CONTINUED SUPPORT FOR AMERICAN MEDICAL EDUCATION FOUNDATION

Yes, I did write a president's letter on the American Medical Education Foundation for the April issue of MINNESOTA MEDICINE. Our 1956 solicitation for contributions is under way now, and I feel it is so vital that we improve our giving that I want to use this opportunity to re-emphasize it.

Dr. Herman Drill, as general chairman of the State Committee in 1955, did an excellent job in organizing the State into local component society committees, working under an executive committee of one member from each councilor district. As a result of the effort put forth in 1955, \$28,313.75 was contributed by Minnesota doctors, as compared with \$5,890.38 in 1954. As a result of the success of his plan, Doctor Drill was asked to speak at the 1956 State Chairman's Conference in Chicago last February. In his report, Doctor Drill attributed the success of the Minnesota campaign to repeated committee meetings with county and district chairmen and the quick elimination of committee members who were not active. This stresses the importance of an active functioning committee on the local level. The enthusiasm of the local committee will inspire the membership. Dr. Charles Rea, as state chairman, is a worthy successor to Doctor Drill.

Several county societies, I believe, deserve special mention for their accomplishments. McLeod County had 100 per cent participation and reached over 95 per cent of its stated goal. Other counties rating high individual membership participation were Blue Earth, Waseca, Wabasha, Steele, Goodhue, and Blue Earth Valley Society.

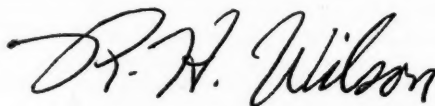
Our eighty-one medical schools are all suffering from lack of funds. In the tax-supported schools, such as Minnesota, all their tax funds are earmarked for specific purposes, salaries are fixed, research is limited by a strict budget. The mounting costs of education have hit the privately endowed schools also. Ten million dollars additional annually is needed for the medical schools to continue their research, keep their salaries up to where they will not be losing valuable men by salary budget limitations.

Unless private contributions from the doctors of the nation, from industry interested in medicine, and community-minded citizens are forthcoming to meet these needs, the schools will be forced into accepting federal grants. Federal grants mean federal control, another step toward socialization, and it seems that I recall we have been fighting socialization of medicine for some time.

Every medical school desperately needs unrestricted funds that can be called upon for research, equipment, and salaries that are not provided for in a rigid budget.

Have you missed the nominal contribution you made last year? Can you even recall what you gave last year? Would you suffer too much if you doubled it this year, so we could really point to our record with pride?

We are proud of the medical institutions in Minnesota. Let's make the medical institutions of Minnesota and the nation proud of us as Doctors of Minnesota.



President, Minnesota State Medical Association

Medical Economics

Edited by the
Committee on Medical Economics,
Minnesota State Medical Association
George Earl, M.D., Chairman

NEW POLL REVEALS PHYSICIANS' OPINIONS ON SOCIAL SECURITY

Many state medical associations, including Minnesota, have conducted polls to determine physicians' attitudes on Social Security. Until recently, when the magazine *Medical Economics* undertook a new survey, no major poll had narrowed the respondents' choice to just two possibilities: *compulsory* or *no coverage*. Given this choice, here is how a representative cross-section of physicians say they would decide: 59.8 per cent favor *no coverage* and 40.2 per cent favor *compulsory coverage*. Those favoring compulsory coverage include, generally, men with gross earnings around the \$10,000 level; men in cities of 500,000 or more population and men who specialize in dermatology or psychiatry. (Psychiatrists favor compulsory coverage by a 64 per cent majority—the highest for any category.)

In contrast, opposition to compulsory coverage is strongest among these groups: men who have been in practice less than ten years, men with gross incomes of \$40,000 or more a year; men in towns with less than 25,000 population and men who specialize in orthopedic surgery.

A convincing article on "Social Insecurity—the Trap Awaiting the Young M.D." appeared on page 231 of the September 15, 1956, issue of the *Journal AMA*. Physicians are urged to read this article which is the first part of a two-part article. The second part will appear in a subsequent issue of the *Journal*.

Refunds

A refund you get of an overpayment on your state income tax may have to be reported as income on your federal tax return. That is spelled out by the Internal Revenue Service in a new ruling. If you included the state tax in itemizing deductions on your federal return, you must report as income the amount of the refund that equals the tax benefit you received. If, however, you used the standard deduction, or the federal return short form on which your tax is figured for you from tables, you need not report the refund.

Contributions to Colleges

An alumni association of the college you attended may qualify as an organization operated for educational purposes, the federal tax collector rules. If so, contributions you make to the association would be deductible for income tax purposes. The association must be under direct control of the school, and the payments you make must be outright contributions—not alumni dues for which you receive some benefit in return.

Medical Travel Expenses

The Internal Revenue Service is not softening its stand against deductibility of medical travel expenses. Its latest ruling involves a person suffering from a serious illness whose condition was worsened by worry over a family member injured in an accident. On medical advice, this person made trips to Florida and California "for a complete change of environment and living conditions." Subsequently, a ruling was requested as to whether travel costs came under healing of medical care.

The ruling stated that "expenses which were merely for a change in the patient's environment or the improvement of his morale and the general mitigation of his condition, which might result from a general improvement in his health, are not amounts paid for medical care. Accordingly, such expenses may not be taken into consideration in determining the amount of a deduction for expenses paid for medical care."

Hospital Costs, Services to be Studied

Ray E. Brown, president of the American Hospital Association, announced recently that it was costing 116 per cent more to care for hospital patients now than it did ten years ago. Expenditures for a patient-day in all types of hospitals rose from an average of \$5.21 to \$11.24 between 1946 and 1955. The same report indicated a 34 per cent increase in hospital admissions and a rise of 63 per cent in hospital births during the last ten years.

Now the AMA is about to launch a study to learn what the hospital patient gets for his money.

It will be the second phase of a three-part, five-year study measuring the medical services given to the American people by their physicians. The survey, which will cost about \$100,000 when completed, is the first of its kind—measuring services and not money spent.

The results, which will be published late in 1958, may help bring about changes in hospital construction, medical education, health insurance rates and other health care matters. Questionnaires have been mailed to 7,000 hospitals to learn the age, sex, length of stay and diagnoses for every hospitalized person discharged during the third week of October, 1956.

This current questionnaire will help answer such questions as "Which ailments or conditions are sending most Americans to hospitals, which are keeping them there the longest; how many beds are taken up by accidents casualties, by pregnant women, by patients undergoing non-emergency surgery?"

WHAT AMERICANS SPEND FOR MEDICAL CARE

The average American family spends 4 to 5 per cent of its yearly income for medical care and related services. For the nation, the total spent on personal health services—either as out-of-pocket expenditures by the family or by prepayment for those having such protection through Blue Cross, Blue Shield or insurance companies—was \$10.2 billion in 1953, a recent survey shows. This contrasts with the \$11.8 billion spent for recreation; \$14.2 billion spent for alcoholic beverages and tobacco and \$23.6 billion for private automobile purchase and maintenance.

LEGISLATION OUTLAWING DANGEROUS CHEMICALS PROPOSED

The AMA Board of Trustees has authorized the Committee on Toxicology to proceed with plans for the drafting of proposed legislation which would require labeling of dangerous household and commercial chemicals.

The action was prompted by the growing need for model legislation requiring precautionary labeling of those chemical products considered potentially harmful. There are many such products universally used which contain possibly harmful ingredients. Purpose of the proposed legislation is to reduce careless and ignorant handling

and storage of chemicals found in and around the home. Any proposed legislation should require informative labeling on household chemical items, including listing of possibly harmful ingredients, their potentialities for harm, their directions for safe use and first aid instructions for poisoning emergencies.

NEW SURGEON GENERAL

Dr. Leroy E. Burney has been sworn in as the eighth person to hold the title of Surgeon General in the United States Public Health Service. His appointment will be sent to the Senate in January for confirmation. For the past two years, Doctor Burney has been Deputy Chief of the Bureau of State Service of the Public Health Service. He succeeds Dr. Leonard A. Scheele.

LEADERS PREDICT FUTURE OF MEDICAL PRACTICE

A forecast of the practice of medicine in 1966 by 400 of the country's medical leaders included these predictions:

"Because of the relative decline of the solo practitioner, by 1966 most practitioners may be won over to some form of group or partnership practice."

The forecasts goes on to state that "the malpractice problem will be worse before it gets better, but it will get better. By 1966 physicians will be better trained; they will keep better records and they will get more help from their medico-legal committees."

Between 80 and 85 per cent of the population will "have some kind of health insurance coverage" by 1966. The prediction is that the enactment of compulsory health insurance seems unlikely "barring a stiff depression. What is more likely is that voluntary plans will offer 'full-service coverage' without income ceilings in almost all parts of the country."

"There will be more hospitals with entirely salaried staffs and staff members may be subject to an increasing degree of regulation. Many physicians will be likely to affiliate with only one hospital—and be obliged to attend the meetings of only one staff."

The forecast includes the prediction that medical schools will be turning out a larger percentage of G.P.'s by 1966 than at any time since the early thirties.

The three specialties likely to undergo the big-

gest changes are internal medicine, psychiatry, and medical nuclear physics.

The leaders questioned stated that they believe "internists will probably serve as family doctors; the increasing tempo confusion and frustration of modern living will make psychiatric expansion inevitable, and medical nuclear physics will show a fantastic growth.

FEDERAL GRANTS FOR MEDICAL RESEARCH

Institutes Receive Increases

If medical research doesn't move ahead in the current fiscal year (ending June 30, 1957), it won't be the fault of Congress. The seven research organizations that make up the National Institutes of Health have far more money than they have ever had, and probably much more than their directors even dared hope for last winter at the start of hearings on their budgets. Every one of the research institutes received a substantial increase over last year, and the funds of five of them were almost doubled.

The Institutes have a total of \$170.4 million to spend before next July 1. This is about 80 per cent more than they had last year. In discussing the appropriations bill on the Senate floor, Senator Lister Hill (D., Ala.) said the bulk of the money will go for grants to non-federal institutions—hospitals, medical schools, clinics and state and local organizations engaged in research.

A breakdown by disease categories shows the following picture:

For cancer research, \$48.4 million, in contrast to \$24.8 million for the previous year. This year's total is \$16 million more than the administration asked when budget requests were sent to Congress in January.

For mental health work, \$35.1 million, in contrast to last year's \$18 million. This is \$13.4 million more than had been requested originally.

For heart disease research, \$33.3 million, compared with \$18.7 million last year and \$22.1 million originally requested.

For work on arthritis and metabolic diseases, \$15.8 million, or \$5.1 million more than last year and \$2.5 million more than Congress was asked for.

For research in neurology and blindness, \$18.6 million, compared with \$9.8 million last year and \$12.1 million originally requested.

For work on allergies and infectious diseases,

\$13.2 million, compared with \$7.5 million last year and \$9.7 requested.

For dental research \$6 million. While this is small compared with money voted for other U. S. research institutes, it is almost triple the \$2.1 million spent last year. The huge increase is the result of a sustained campaign by the American Dental Association.

First Grants Under New Research Construction Law Announced

Four medical schools, a hospital and a research center are recipients of the government's first grants under a new law authorizing 50-50 matching funds for support of medical research construction and equipment.

Initial awards totaled \$765,159 with the University of Minnesota receiving \$187,110 for two projects. Other recipients include Georgetown University, the University of Pennsylvania, Albany Medical College, Massachusetts General Hospital and Christ Hospital Institute.

SUPREME COURT TO REVIEW NUMEROUS MEDICAL CASES

The U. S. Supreme Court opened its 1956-57 session in October with a number of medical cases among those it is being asked to review. Some of these include:

1. Does the taking of a blood specimen for the purpose of sobriety test from an unconscious person constitute denial of due process of law?
2. Alleged denial of due process is also the basis of a case involving a state's right to exclude naturopathy from licensure as a healing art.
3. Is the Federal Food and Drug Act "too vague and indefinite"? This is based on a case of a Florida druggist convicted of selling a habit-forming drug without a prescription.
4. Fraud, deceit, misrepresentation were employed by a government agent who obtained evidence leading to his conviction of prescribing narcotics to a person not under his medical care, according to an osteopathic physician who is petitioning for review.

There is a general reluctance on the part of elderly men to submit to medical examination, especially if it means going to a clinic or hospital. They will more readily call in the doctor or go to the general practitioner's surgery; old people do not look with much favor on a visit to the mass radiography service.—F. R. G. HEAF, M.D., J. Royal Inst. Pub. Health and Hygiene, Nov., 1955.

Meetings and Announcements

MEDICAL MEETINGS

STATE

MINNESOTA STATE MEDICAL ASSOCIATION, 104th annual meeting, Saint Paul, May 13, 14 and 15, 1957.

Mediclinics of Minnesota, Fort Lauderdale, Florida, March 4-14, 1957.

For information write 516 Medical Arts Building, Minneapolis 2, Minnesota.

NATIONAL

American College of Surgeons, sectional meeting, Hotels Lowry and St. Paul, St. Paul, Minnesota, April 8-10, 1957. Write Dr. H. Prather Saunders, Associate Director, American College of Surgeons, 40 East Erie St., Chicago 11, Illinois.

Centennial Exposition, Academy of Medicine of Cincinnati, Health Museum, Cincinnati, Ohio, February 27-March 5, 1957.

Centennial Exposition, 100th anniversary of the Academy of Medicine of Cincinnati, Music Hall, Cincinnati, Ohio, February 27-March 5, 1957.

Milwaukee Academy of Medicine, symposium on immunology, Marquette University Brooks Memorial Union, Milwaukee, Wisconsin, December 1.

INTERNATIONAL

Pan American Congress on Cancer Cytology, Miami, Florida, January 8-12, 1957. Dr. J. Ernest Ayre, chairman, 1155 N. W. 14th St., Miami, Florida.

Pan-Pacific Surgical Association, seventh congress, Honolulu, Hawaii, November 14-22, 1957. Write Dr. F. J. Pinkerton, director-general of the Pan-Pacific Surgical Association, Room 230, Young Building, Honolulu, Hawaii.

AERO MEDICAL ASSOCIATION

Medicine in the jet-atomic age of flight will be the central theme of the 28th annual meeting of the Aero Medical Association at the Shirley Savoy Hotel in Denver, May 6-8, 1957, under the presidency of Dr. Jan H. Tillisch, Rochester.

The scientific program will include reports on emergency escape from high performance aircraft, new developments in airline passenger comfort and safety, and current research in manned space satellites. The American Board of Preventive Medicine will conduct examinations for certification in aviation medicine in Denver from May 3 to 5.

Dr. Nolie Mumey, Denver, is general chairman of the meeting. Speakers desiring to participate in the

scientific sessions should send the title of the proposed paper and a 150-word abstract prior to December 1 to Dr. E. J. Baldes, chairman of the Scientific Program Committee, Mayo Clinic, Rochester, Minnesota.

WORLD MEDICAL ASSOCIATION PLANS SECOND CONFERENCE

The Second World Conference on Medical Education, sponsored by the World Medical Association, will be held in Chicago, Illinois, August 30 to September 4, 1959. Object of the conference will be to exchange information to assist in raising the standards of medical education of the world. Deputy president of the organization is Dr. Victor Johnson, director of the Mayo Foundation for Medical Education and Research, University of Minnesota Graduate School.

MEDICAL CONTINUATION COURSES

The following courses will be presented at the Center for Continuation Study, University of Minnesota.

November 5-9—Radiation Therapy for Radiologists

November 19-21—Fractures for General Physicians

December 6-8—Physical Medicine for Specialists

January 3-5—Urology for General Physicians

January 7-9—Dermatology for General Physicians

January 31-Feb. 2—Emergency Surgery for General Physicians

For further information, write to the Director, Department of Continuation Medical Education, 1342 Mayo Memorial, University of Minnesota, Minneapolis 14.

NEW ORLEANS GRADUATE MEDICAL ASSEMBLY

The twentieth annual meeting of the New Orleans Graduate Medical Assembly will be held March 11, 12, 13 and 14, with headquarters at the Municipal Auditorium in New Orleans.

Eighteen guest speakers will participate. The program will include fifty-four informative discussions in addition to clinicopathologic conferences, symposia, scientific exhibits, medical motion pictures, round-table luncheons and technical exhibits.

A postclinical tour will follow the meeting. On March 16 a party composed of doctors and their families will leave from New York for the Mediterranean and Europe via plane. The itinerary includes France, Greece, Turkey, Egypt, Jerusalem, Lebanon, Syria and Italy. Arrangements have been made for medical programs in the places visited. The official tour terminates in Rome on April 12, but arrangements may be made for independent travel to any points in Europe desired.

Details of the New Orleans meeting and the post-clinical tour are available at the office of the Assembly, Room 103, 1430 Tulane Avenue, New Orleans 12, Louisiana.

Woman's Auxiliary

TWO MINNESOTA OFFICERS ATTEND CHICAGO CONFERENCE

Mrs. L. P. Howell, Minnesota Auxiliary president, and your president-elect, attended the 13th annual conference for Auxiliary presidents and presidents-elect at the Drake Hotel in Chicago October 1, 2 and 3. The conference theme this year was "Health Is Our Greatest Heritage."

The first two days were devoted to panel discussions on major Auxiliary interests: AMEF, Civil Defense, Safety, Recruitment, Program, Organization, Public Relations, Legislation (a review of legislation passed by the 84th Congress), *Today's Health* and *The Bulletin*. There was also a history report and a humorous panel on finance.

The national committee chairman acted as moderator for the panel which concerned her particular field of work, and the panel speakers included state presidents and other experts (physicians and members of the AMA staff) who summed up material, added information and answered questions.

The panel on Program, in which Mrs. Howell ably participated, included a discussion on how state presidents can strengthen the Auxiliary program.

Some new ideas on rehabilitation at the community level were suggested by Dr. Ralph E. DeForest, secretary of the AMA Council on Physical Medicine and Rehabilitation.

Dr. Irene Josselyn, who participated in the Mental Health Panel said, "We do not know how much mental illness we can prevent, but the more that we can do to relieve the strain on children, the more we can hope it will prevent breakdowns later." She stressed that the hidden cost of disturbed children is much more than the cost of treatment; she also warned that child guidance clinics should be a medical organization under a psychologist trained in child psychology and to start a clinic only on the level where you have trained personnel to carry on. We can prepare the community to understand that a child who has difficulty growing up may need treatment.

Very impressive was the legislative panel and the five state presidents who, in three minutes each, gave fine summaries of some of the controversial bills of the 84th Congress. Mr. C. Joseph Stetler, Director of the AMA Law Department, summed up this discussion and said that he expects many more bills affecting the practice of medicine to come up in the next session of Congress. He warned that unless physicians as individuals wake up to what is going on in Washington that many more inroads into medical controls can be expected. He stressed the importance of selecting and appointing capable legislative officers. There will be available to the Auxiliary five or six bills for study and he urged us to be sure our husbands studied them, too. Dr. Horace Campbell, Denver, a member of the AMA Committee on Medical Aspects of Automotive

Injuries and Deaths, suggested that we should change our ideas on safe driving and preventing accidents because one-half of the cars now on the road will be involved in accidents before they are junked; so safe driving instruction has not halted the traffic toll. Therefore, he believes we should demand safer cars equipped with energy-absorbing material. These have been studied and are practical. Dr. Campbell also said these cars will be manufactured only if it is assured that they will sell and it is the women who can set the style, and demand and create the market for these safer cars.

The conference was not without its lighter side. A woman from Missouri found herself wearing the same hat as the president of the Idaho Auxiliary. She changed her hat the next day only to find that the National Treasurer from Montana was wearing an identical copy.

Perhaps this dilemma gave Dr. David Allman, president-elect of the AMA, the theme of the talk he gave at lunch on Tuesday. He suggested that we should all have "B's in our Bonnets": **Barnstorming**, to get down to the grass roots and community level; **Broadcasting** medicine's wonderful story and learning the functions of the AMA; **Buttonholing** and correcting misinformation, and **Blazing** new trails in service in medical fields.

Never was the value of our Auxiliary and its program questioned. We were accepted and welcomed as part of the medical team. Nowhere was this more evident than on Wednesday when we were taken on a tour of the AMA building where the various offices and functions were explained to us. The scope of the activity in which the AMA engages to protect our doctors and their profession is awe inspiring.

There were many suggestions for programs on the community level and in order to keep more government out of medicine, Auxiliary members are urged to meet the needs of their locale and educate themselves and other people about the cost and calibre of government medicine.

(Mrs. C. L.) HELEN OPPEGAARD
President-elect, MSMA Auxiliary

AUXILIARY MEMBERS ENTERTAINED AT NORTHERN, SOUTHERN MEETINGS

The September meetings of the Northern and Southern Minnesota Medical Associations, held in Alexandria and New Ulm respectively, included activities for wives of the physicians who attended.

Mrs. L. P. Howell, state Auxiliary president, was present at both meetings. The Northern group met September 7 and 8, and thirty-six women attended a luncheon at which both Mrs. Howell and President-elect Mrs. C. L. Oppegaard, Crookston, spoke.

That evening, after the banquet, Dr. and Mrs. Corrin H. Hodgson, Rochester, presented an interesting program on their recent trip to Africa. They showed and narrated a film which they said they would be

glad to present before other groups, as many as they can accommodate.

Members of the Brown County Medical Auxiliary entertained the wives of physicians who attended the Southern Minnesota meeting September 10. The day began with registration, followed by a coffee party at the summer home of Dr. T. R. Fritsche. Later local hostesses served as chauffeurs for a tour of the city. A luncheon for forty, followed by a style show, was enjoyed at noon. Mrs. Howell also gave a short talk at this luncheon. In the evening, the women joined their husbands for a social hour and banquet.

ANNUAL SCHOOL OF INSTRUCTION ATTRACTS LARGE TURN-OUT

The 1956 School of Instruction for state and county Auxiliary officers and committee chairmen attracted nearly 100 women from all over the state. The successful "school day" was held Tuesday, October 9, at the Curtis Hotel in Minneapolis. After a meeting of the board, the program opened with a "Panel on Auxiliary Projects." Mrs. W. E. Wellman, Rochester, discussed AMEF; Mrs. H. P. VanCleve, Austin, *Today's Health*, and Mrs. E. H. Soule, Rochester, stressed the importance of "Recruitment." The second panel included six speakers on "Program Planning for the County Meeting." Mrs. O. M. Heiberg, Worthington, talked on "Use Your Tools"; Mrs. William Gjerde, Lake City, spoke on "New Developments in the Mental Health Field," "Care of the Aging" was stressed by Mrs. Reuben Erickson, Minneapolis. Mrs. Lyle French, Minneapolis, described "A Health Day with Public Appeal"; Mrs. M. I. Hauge, Clarkfield, presented "Handling the Mail" and Mrs. Charles Merkert, Minneapolis, suggested making use of current literary material on medicine as program material.

Highlight of the luncheon was a most enlightening talk on Russia and life of Russian women and children by *Minneapolis Tribune* columnist George Grim. Dr. R. H. Wilson, Winona, brought greetings as president of the state medical association and Harold Brunn, assistant executive secretary of the state medical association, discussed legislation.

The program closed with the new AMA film, "The Case of the Doubting Doctor," which was introduced by Mrs. H. E. Bakkila, Duluth.

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Contributions for this column, including news and activities of State Auxiliary societies and items of interest about members, may be sent to Mrs. A. B. Rosenfield, Woman's Auxiliary Editor, MINNESOTA MEDICINE, 2920 Dean Boulevard, Minneapolis, Minnesota.

In Memoriam

GLENN P. SCHMITZ

Dr. Glenn P. Schmitz, Little Falls physician, died September 26, 1956, at the Variety Club Heart Hospital, Minneapolis. He was thirty-seven years old.

Born in Ogema, Minnesota, April 13, 1919, Dr. Schmitz graduated from St. John's University, Collegeville, Minnesota, and completed his medical education at St. Louis University, St. Louis, Missouri. He interned at Wheeling Hospital, Wheeling, West Virginia, and then spent two years in the United States Army. He practiced at Holdingford, Minnesota, for one year and moved to Little Falls in 1948. He was a member of the staff of St. Gabriel's Hospital, Little Falls, the Upper Mississippi Medical Society, the Minnesota State Medical Association and the American Medical Association.

Dr. Schmitz is survived by his mother; Mrs. Clara Schmitz, Little Falls; two children, Steven, eight, and Laurie, ten, both of Topeka, Kansas; a brother, Dr. E. J. Schmitz, U. S. Naval Hospital, Great Lakes, Illinois; and a sister, Mrs. S. D. Battaglia, San Jose, California.

WILLIAM G. STROBEL

Dr. William G. Strobel, Duluth physician for thirty-five years, died September 20, 1956. He was seventy years old.

A native of Mankato, Minnesota, Dr. Strobel was former chief of staff of St. Mary's Hospital, Duluth, and was associated with the Duluth Clinic.

He graduated from the University of Minnesota and from Rush Medical School, Chicago, Illinois, and interned at Cook County Hospital, Chicago, and St. Luke's Hospital and Mounds Park Sanatorium, St. Paul. He was resident physician at the Faribault School for Retarded Children and practiced at Welcome, Minnesota, from 1914 to 1920.

A charter member of the Duluth Surgical Society, Dr. Strobel was also a member of the St. Louis County Medical Society. Other memberships included the Interurban Medical Society, the American College of Surgeons, the American Proctologic Society and the International Society of Gastroenterology and Proctology.

He also served on the staffs of St. Luke's Hospital and Miller Memorial Hospital, Duluth, and was active in the Glen Avon Masonic Lodge AF and Am, was a 32nd Degree Mason and a member of the Duluth Scottish Rite bodies. He also belonged to the Twin Cities unit of the Shrine Crippled Children's Hospital.

Survivors include his wife, Alice; three daughters, Mrs. Herbert Burns and Mrs. Hubert Wheeler, Duluth, and Mrs. Robert White, Arlington Heights, Illinois, and ten grandchildren.